DOCUMENT RESUME

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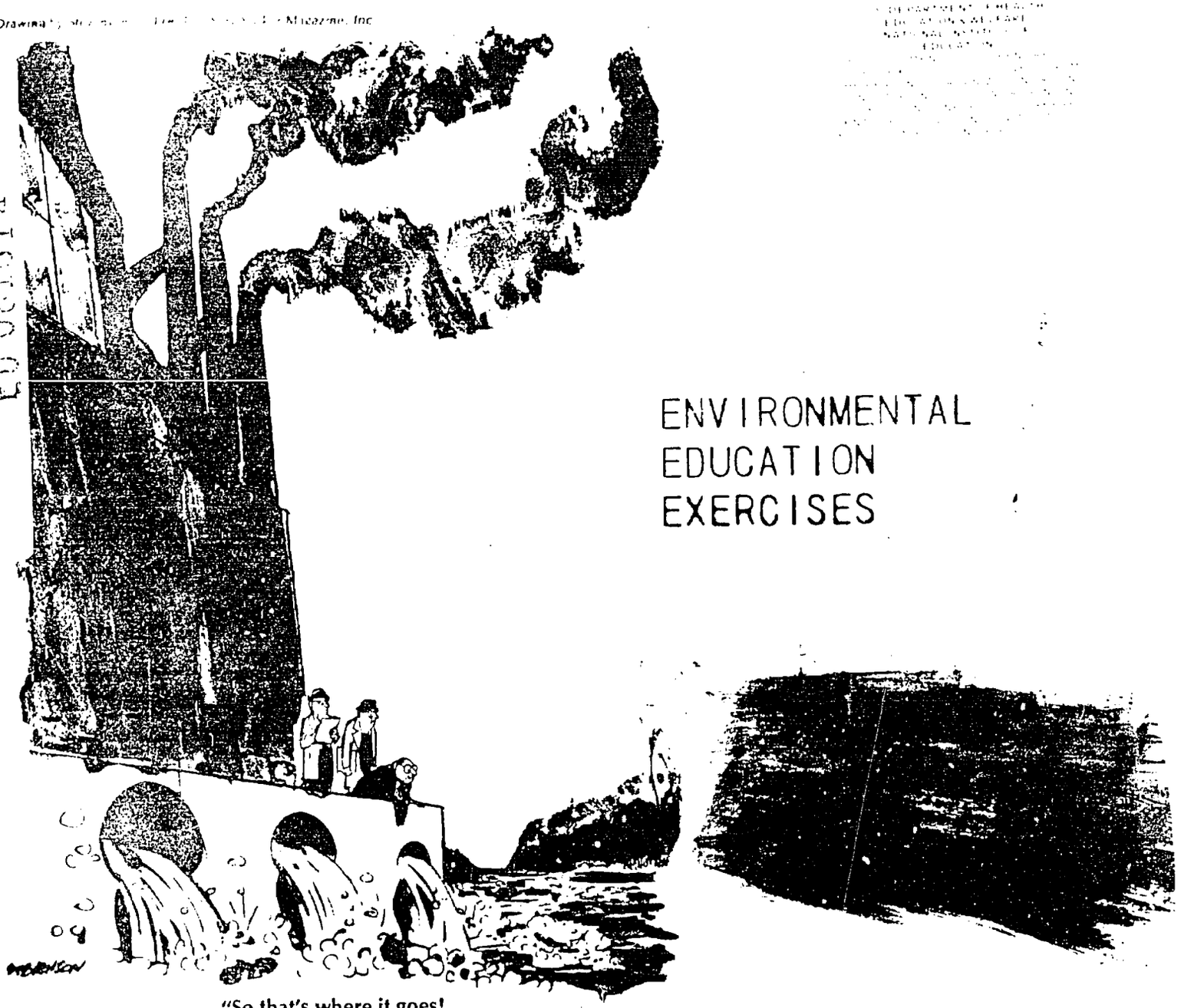
ABSTRACT

Selected and prepared by classroom teachers, these environmental education exercises were developed to be incorporated into specific subject matter areas, not to provide an additional course or unit. Activities in this teacher's guide for junior high grades 7-8 are directed toward art, language arts, science, social studies, and special education. Each of the 62 exercises enumerates in outline form the title of the lesson, behavioral objectives, materials needed, major activities, follow-up activities, evaluation questions or objectives, and reference materials. Charts or diagrams are included where necessary to supplement the explanations. This work was prepared under an ESEA Title III contract. Related documents are SE 016 629, SE 016 630, and SE 016 632. (BL)



"So that's where it goes!
Well, I'd like to thank you fellows
for bringing this to my attention."

ENVIRONMENTAL EDUCATION EXERCISES

Bourbon County Schools
Environmental Education Department
Paris, Kentucky 40361

JUNIOR HIGH
7-8

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FOREWORD

The enclosed "Exercises" were selected and prepared by classroom teachers. They were developed to be incorporated into specific subject matter areas and not to provide an additional course or unit.

Many teachers have been teaching environmental topics and several of these are included. Programs from around the country were reviewed and selections made from these that were applicable to our situation.

Several "Exercises" were intended to be used in the out-of-doors. Many school grounds have a variety of plants and animals which can be used for outdoor studies.

BOURBON COUNTY SCHOOLS
ENVIRONMENTAL EDUCATION DEPARTMENT
HAROLD GROOMS, COORDINATOR
PARIS, KENTUCKY 40361

November, 1972
(Revised Edition)

TITLE III, ESEA
REGION IV-B
400 LAFAYETTE PARKWAY
LEXINGTON, KENTUCKY 40503

ART EXERCISE PLANS

Incorporating Environmental Studies

JUNIOR HIGH SCHOOL LEVEL

Compiled by:

Mr. Steve Statzer
Art Teacher
Bourbon County Junior High School
Paris, Kentucky 40361

ART IN NATURE

Art in nature, at this level, is basically the same as for the elementary level, but somewhat more advanced. There is no real need for going back through the first grade to the sixth grade to see what they have done, for this would be a waste of time.

Art on the junior high school level will not dig as deep into the environment, but will grasp the area only at selected intervals. This is stated for the reason that the art class, unlike that of the elementary grades, is becoming more advanced and complex. Thus, with limited time, all individual subjects cannot be studied at length.

By placing environmental education with the emphasis on ecology, this most important subject can be joined in the classroom proceeding at predetermined intervals. The art teacher should never forget the importance of ecology and our environment for he has the subject and the facilities to promote a genuine interest toward his students.

Steve Statzer

EXERCISE #1

Title of Lesson: Art and Nature

Objectives:

1) To procure a better understanding of art as it works hand in hand with nature
2) To go out into nature by the use of the outdoor laboratory
3) To study nature at a close range (example: for one to draw a leaf in correct form, he must take it in his hand, look it over, and see what it is really made of)

Materials Needed:

1) Drawing paper and pencils
2) Crayons
3) Water colors

Activities:

1) Leave the classroom at certain intervals and visit the outdoor laboratory.
2) Have general group discussions on the outdoor laboratory and how it will help us to have a better understanding of nature and art.
3) Sample each of the offerings of laboratory to understand different segments of nature.

Evaluation:

1) When the assignment is through, check and see if each student has done his work correctly and has kept on the subject.
2) Evaluate the art program as coordinated with the outdoor laboratory to see if they work feasibly together.

Reference Materials:

1) Book and periodicals from the school library
2) Filmstrips and movies
3) Guest lecturers
4) All that the outdoor laboratory has to offer

EXERCISE #2

Title of Lesson: Art and Ecology

Objectives:

1) To show your students how natural beauty is being disrupted
2) To point out that if nature is destroyed, so is the foundation for any art program
3) To show the public, through art, what is happening to nature and what can be done

Materials Needed:

1) Poster board
2) Pen and ink
3) Crayons

4) Pencils
5) Drawing paper
6) Water colors

Activities:

1) The teacher and students should have group discussions to see what kind or form of art should be done.
2) Break the work to be done down into its simplest form for this will catch the public's eye.
3) Let your work (poster boards, drawings, paintings, etc.) have feeling so the person who sees this work knows exactly how you felt and what you are trying to say.

Evaluation:

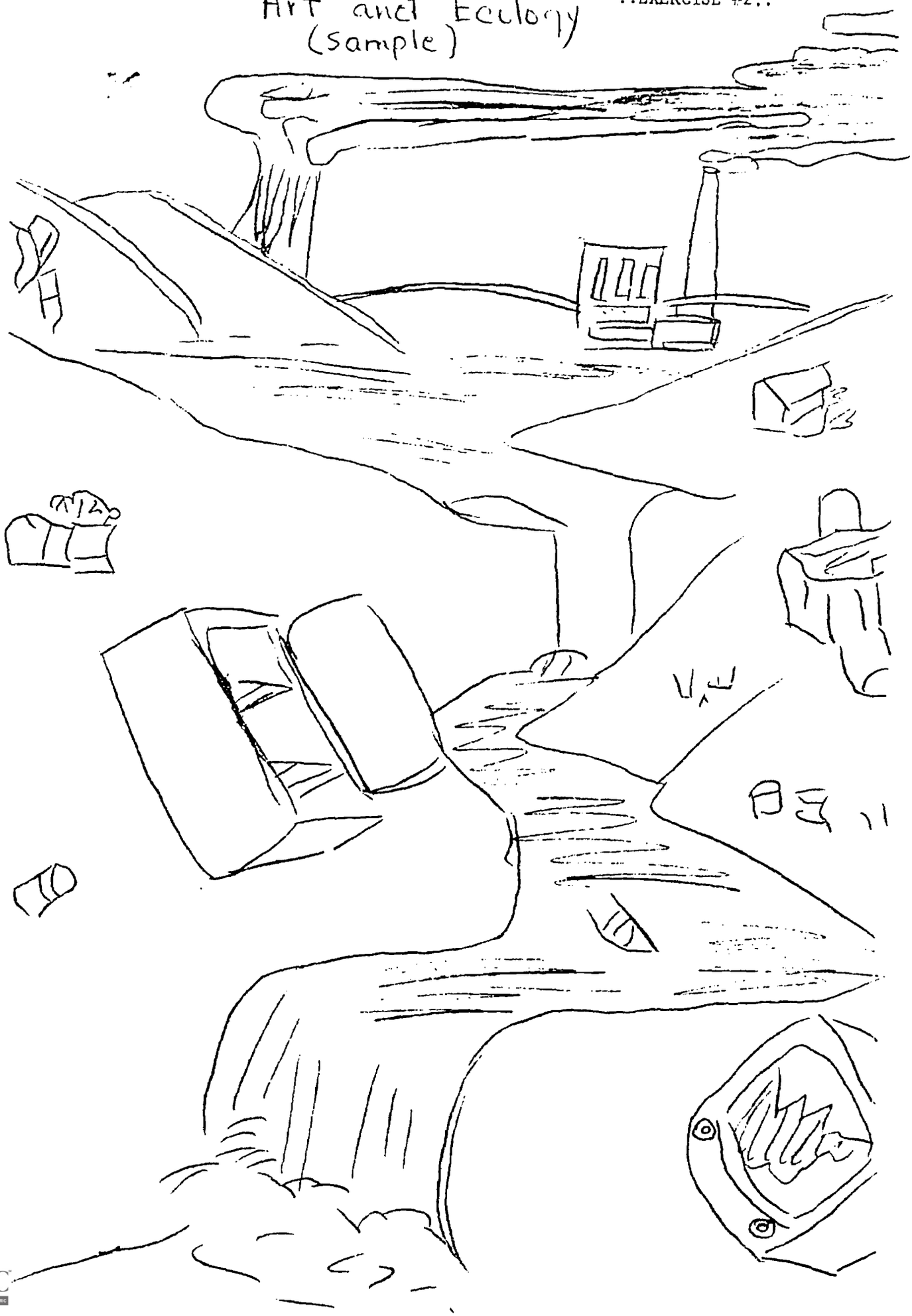
When the assignment is through, check and see if each student has done his work correctly and has kept on the subject.

Reference Materials:

1) Books and periodicals from the school library
2) Filmstrips and movies
3) Guest lecturers

Art and Ecology (sample)

..EXERCISE #2..



EXERCISE #3

Title of Lesson: Nature from the Art Room (Classroom Study)

Objectives:

1) To work from the classroom on nature without being out-of-doors
2) To learn of the world of art being associated with nature through the works of other men

Materials Needed:

1) Books and films
2) Pencils
3) Drawing paper
4) Crayons
5) Water colors
6) Ink
7) Poster board

Activities:

1) To create group interraction to boast enthusiasm on the topic
2) Show movies and filmstrips to acquaint students with subjects.
3) Have outside lecturers to come and discuss the topic of art and nature.
4) Have students plan an appropriate art guide to help them with their individual work.

Evaluation:

When the assignment is through, check and see if each student has done his work correctly and has kept on the subject.

Reference Materials:

1) Books and periodicals from the school library
2) Filmstrips and movies
3) Guest lecturers

EXERCISE #4

Title of Lesson: Design: Shape and Form

Objectives:

1) To be able to identify certain shapes that react in a certain manner while making up the scheme of natural forms
2) Relate the natural structure (trees, leaves, etc.) into the forms that mankind has produced
3) Note the natural symmetry of nature's works (tree trunks, spider webs, etc.)
4) To show with visual experience that, without proper design, the functions of most things, unnatural and natural, would not stand the forces of nature

Materials Needed:

1) Drawing paper

2) Ink
3) Crayons
4) Water colors

Activities:

1) Classroom discussions of the topic.
2) Field trips both to natural surroundings and to the city to show design factors.
3) Show filmstrips and movies covering topic.

EXERCISE #5

Title of Lesson: Color: Lights and Darks

Objectives:

1) To be able to distinguish shapes and the outline forms simply by shadows of darks and lights
2) Recognize structural design by color make-up (example: light and dark make-up of the chlorophyll composition of a leaf)
3) Noting natural colors: bright red roses, very yellow buttercups

Materials Needed:

1) Pencils
2) Crayons
3) Drawing paper
4) Construction paper
5) Water colors

Activities:

1) Visit the outdoor laboratory as frequently as possible, for that is where the real essence of natural color lies for our specific need.
2) Take field trips to some of our surrounding farms and parks.
3) Filmstrips and movies covering topic.
4) Books and periodicals (example: Audubon Magazine).

Reference Materials:

1) Nature magazines
2) Movies and filmstrips from the University of Kentucky or school and public libraries

EXERCISE #6

Title of Lesson: Art (Environmental Posters)

Objectives:

1) To make your poster say something with feeling toward the related topic
2) Each student should try to find his own title and topic
3) Have your students keep the poster simple, but to the point

EXERCISE #6 (cont.)

Materials Needed:

1) Paper
2) Poster board
3) Pencils
4) Water colors
5) Crayons

Activities:

1) Do a small preliminary drawing.
2) Start by copying the first drawing lightly on poster board.
3) Make sure your ideas are relevant to the topic.
4) Finish the poster by coloring it.
5) Use appropriate lettering.

Follow-up Activities:

1) Show posters throughout the school system and throughout the city if possible.
2) Have the students take them home for future use.

Evaluation:

When the assignment is through, check and see if each student has done his work correctly and has kept on the subject.

Reference Materials:

Brochures on the topic from interested commercial companies

(sample)

..EXERCISE #6..

ENVIRONMENTAL POSTER IDEAS

1) From Sea to Shining Sea (junked cars piled to top of poster)

2) Thanks for Lunch (rats eating out of trash cans)

3) For Purple Mountains Majesty (a mountain of cars)

4) America the Beautiful (burned, naked trees)

5) A Beautiful World: Don't Spoil It (trees, mushrooms, butterflies)

6) Can of DDT and Human Hand Spraying Bugs (people lying dead)

7) Isn't America Beautiful (men on stilts with clothespin on nose, sewer pipe running in, walking in sewage)

8) Save Our Nation from Disaster: Stop Pollution (town background, air pollution, river pollution, natural surroundings with litter)

9) Save Natural Resources (picture of tree and big frogs)

10) The Funeral (birds sitting around tombstone and on tombstone for example: Ben R.I.P. died of D.D.T.)

11) This Is Our Country (snapshots of old houses completely littered, poverty, trash, old cars, etc.--pictures pasted on poster)

12) Wanted: Alive (eagle on a limb)

13) Fight for Your Life (over-littered background)

14) Price of Progress (pollution)

15) The Green, Green Grass of Home (littered yard with big house)

16) Where Have All the Flowers Gone (cover poster with road signs)

17) What Goes Down, Must Come Up (poster with softdrink can and all types of litter pasted on)

18) ORIGINAL IDEAS ARE ALWAYS BETTER

Prepared by:

Bourbon County Schools
Environmental Education Department
Paris, Kentucky 40361

LANGUAGE ARTS EXERCISE PLANS

Incorporating Environmental Studies

JUNIOR HIGH SCHOOL LEVEL

Consulted in Developing:

Mr. Larry Contri
Land Between the Lakes
Golden Pond, Kentucky

Compiled by:

Mrs. Jo Elkins
Language Arts Teacher
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EXERCISE #1

USING OUR ENVIRONMENT AND NATURE TO TEACH ENGLISH SKILLS ON THE JUNIOR HIGH LEVEL

OBJECTIVES:

1) To help students become consciously aware of how nature plays a role (sometimes major, sometimes minor) in literature
2) To help students gain more knowledge about their environment by using english skills

Title of Lesson: Writing a Business Letter

Purpose:

1) To teach students the parts of a business letter
2) To teach students how to write a letter asking for information

Behavioral Objectives: After this exercise, the students should be able to:

1) Use the correct form for a business letter
2) Write an intelligent business letter asking for information
3) Correctly address an envelope

Materials Needed:

1) Macmillan English Series, 7, pp. 150-155
2) List of places to be written is found in Free Environmental Aids, Bourbon County Schools Materials Center
3) Staff liner to draw lines on board

Activities:

1) Present the material as listed in the text.
2) Write sample letter on board.
3) Have students draw up their own sample letters at their desks.
4) Check at their desks for correct form.
5) Teach children to fold the letter correctly.
6) Use the outside of the folded letter as an envelope.
7) Practice addressing envelope.
8) Assign letter requesting environmental education materials for the next day.

Follow-up Activities:

1) Display and discuss materials received from letters.
2) Use information in material received for student reports, oral or written.

Evaluation:

Grade letters and envelopes written by students.

EXERCISE #2

Title of Lesson: Outlining Material

EXERCISE #2 (cont.)

Purpose:

1) To teach students how to find the major and minor points in any given material
2) To teach students how to outline material
3) To teach students the value of an outline
4) To teach students to follow an outline in their writing

Behavioral Objectives: After these exercises, students should be able to:

1) Take a moderately difficult piece of material (written or spoken) and make a sensible and usable outline
2) Make an outline before writing a paragraph or paper
3) Use the outline in writing the paragraph or paper

Materials Needed:

1) Slides available from Bourbon County Schools Materials Center: "Visual Pollution" and "Wildlife"
2) Macmillan English Series, 7
3) Table of Contents (any text)--preferable: English
4) American Writers, Literature, Ginn, 1943
5) "Kentucky Sports", J. J. Audubon

Activities:

1) Use the Table of Contents in a book to demonstrate an outline.
2) Use textbook to introduce parts and mechanics of outlines: Macmillan English Series, 7...a) pp. 170, 171, 112, 116, 117, b) p. 394, capitalization, c) p. 400, punctuation.
3) Use slide set "Visual Pollution" for students to outline or outline as a class: a) examples of visual pollution, b) steps taken to help eliminate visual pollution.
4) Outline a section of a chapter in any textbook the class is using.
5) Make an outline of things you do (did): a) at home in the evening, b) on a trip, c) kinds of pollution.
6) Read essay "Kentucky Sports" by J. J. Audubon: a) take notes on 3 kinds of sports listed, b) give some background information of Audubon.

Follow-up Activities:

1) Write a bird report, following outline given by the science teacher: a) physical appearance, b) habitat, c) food, d) nesting habits, e) eggs.
2) Read story and find outline author used: a) Odd Things About Words, Discovery, Ginn, b) Edward Jenner, Discovery text and workbook, c) Taming der Eiger, Discovery text and workbook.

Evaluation:

1) Show slide set "Wildlife" and have students outline it and then grade.
2) Assign outline from a section in one of the student texts and then grade.
3) Have students make an outline and give oral or written reports from it.

Title of Lesson: Using Nature in Writing Haiku and Cenquien Poetry

Purpose:

To help students develop a keener sense of their outdoor surroundings as a useful tool in writing haiku and cenquien poetry

Behavioral Objectives: At the completion of this exercise, a student should be able to:

1) Write a haiku poem using a nature object as the theme of the poem
2) Write a cenquien using an object from nature as the main idea of the poem

Materials Needed:

1) Writing materials
2) Outdoor classroom and laboratory

Activities:

Take students to the outdoor laboratory. Introduce them to either kind of poetry. (Give an example of the type of poem.) Make one or two example poems as a class. Let students find their own spot and write a poem following the guide lines. Re-assemble in the outdoor classroom. Read orally some of the poems.

HAIKU POETRY:

a) a 3-line poem consisting of 17 syllables: 5 on the first line, 7 on the second line and 5 on the third line
b) don't name object: just describe it; you can express a feeling
c) example: Covering the floor
of a mighty forest stand,
Carpet bed of green.

CENQUIEN POETRY:

a) a 5-line poem: line 1--name object, line 2--abstract description of object, line 3--physical description of object, line 4--another abstract, and line 5--single word synonym for line 1
b) example: Pine
Whistling in the wind
Standing tall in rugged strength
Guarding sentinels of the forests
Evergreen.

Follow-up Activities:

1) Display and illustrate poems on bulletin board.
2) Repeat in classroom when desired, using themes other than nature.

Evaluation:

Have students compose an example of either poem. Grade for form and content.

EXERCISE #4

Title of Lesson: Appreciation and Awareness of Nature

Purpose:

1) To help students become aware of their natural surroundings
2) To help students use these surroundings as a vehicle to writing

Behavioral Objectives: After these exercises, students will be able to:

1) Be aware of their physical surroundings
2) Use the natural surroundings as an integral part of their writing

Materials Needed:

1) Article on "Spiders", Jesse Stuart, Courier, 10-13-57, Discovery, "Engineers Without a Degree"
2) Background materials on Jesse Stuart and Robert Frost

Activities:

First, discuss: Is there anything to write about on a spider? Take "Spiders" and "Engineer Without a Degree", read aloud, discuss use of nature, what author looks for and how he uses what he finds.

1) Take several of the listed selections, read and discuss. Bring out how nature was a part of the selection. Leave out all nature and see what is left (to see how much the nature setting is a part of the selection).
2) Assign one of remaining selections for students the next day to report to call how nature was a part of the writing.
3) Take students outdoors (preferably outdoor lab for a look-see hunt for an object of nature to be used in his own writing).

Follow-up Activities:

(Any of the above)

Evaluation:

1) Report to class on how an author used nature in his work.
2) Write a selection using nature.

OBSERVING NATURE:

"The Wind", Adventures for Readers, Book 1, Laureate Ed.
"Rain", Adventures for Readers, Book 2, p. 137
"When the Frost is on the Pumpkin", Adventures for Readers, Book 2, p. 466
"The Daffodils", Adventures for Readers, Book 2, p. 490
"Fog", Adventures for Readers, Book 2, p. 492
"The River is a Piece of Sky", Adventures for Readers, Book 2, p. 493
"A Leaf Treader", Adventures for Readers, Book 2, p. 494
"A Patch of Snow", Adventures for Readers, Book 2, p. 495
"Stopping by Woods on a Snowy Evening", Adventures for Readers, Book 2, p. 497
"Stars", Adventures for Readers, Book 2, p. 499

"From Spring to Summer", Adventures for Readers, Book 2, p. 538
"When I Consider Thy Heaven", Adventures for Readers, Book 2, p. 550
"Riding at Daybreak", High Trails, p. 68
"Discovery", poem, High Trails, p. 354
"Our Hold on the Planet", Frost, Widening Views, p. 8
"Cocoon", Discovery, p. 35
"Engineers Without College Degrees", Discovery, p. 370
"Our National Parks", Discovery, p. 360
"Lightning", Discovery, p. 354
"Silver", Discovery, p. 441
"Deer Come Down", Prose and Poetry, p. 302
"Forest Fire", Prose and Poetry, p. 290
"Lone Dog", Prose and Poetry, p. 301
"My Land is Fair for Any Eyes to See", Prose and Poetry, p. 297
"Nature's Friends", Prose and Poetry, p. 300
"The Spider", Prose and Poetry, p. 299
"The Skunk: Master of Chemical Warfare", Prose and Poetry, p. 285

EXERCISE #5

INTERPRETATIONS OF NATURE

Title of Lesson: Interpretations of Nature

Purpose:

To help students become aware of the fact that nature can and does affect setting of plot and characters in literature at times

Behavioral Objectives: After these exercises, students should be able to:

1) List at least 8 of the 12 ways nature can be interpreted
2) Identify the way nature is used in a given selection
3) Write a selection of his own using nature primarily in one of its interpretations and identifying the way he is using nature

Activities:

1) Reading, discussing, evaluating the stories and poems.
2) Make a poster or bulletin board illustrating the 12 interpretations of nature.
3) Write own selections making a conscious use of nature in some way.
4) Orally read some student selections and discuss in class the use made of nature.

Evaluation:

Read any of suggested selections and have students discuss the author's use of nature and then grade.

NATURE AFFECTS SETTING

Useful: a way to make a living
"The Reef", Adventures for Readers, Book 2, p. 6
"When the Frost is on the Pumpkin", Adventures for Readers, Book 2, p. 466

"Mafatur, Stout Heart", Discovery, p. 88

Science: a source for math, biological, chemical and physical laws
"From Spring to Summer", Adventures for Readers, Book 2, p. 538
"Four Boys and a Dog", Discovery, p. 322
"Lightning", Discovery, p. 354
"Engineers Without College Degrees", Discovery, p. 370

Beautiful:
"Trees", Adventures for Readers, Book 1
"Song", Adventures for Readers, Book 1
"June", Adventures for Readers, Book 1, p. 412

Friendly: a source of refuge
"The Vagabond", Adventures for Readers, Book 1, Stevenson
"To Call Our Own", Adventures for Readers, Book 2, Stuart, p. 464
"Elsa", Discovery, p. 306
"Our National Parks", Discovery, p. 361

Hostile: disaster and catastrophe
"The Wreck of the Hesperus", Adventures for Readers, Book 1, p. 396
"The Reef", Adventures for Readers, Book 2, p. 6
"Blow, Blow Thou Winter Wind", Adventures for Readers, Book 2, p. 501
"Pilot's Choice", Adventures for Readers, Book 2, p. 598
"Survival", High Trails, p. 38
"The Snowstorm", High Trails, p. 52
"The She-Wolf", High Trails, p. 53
"Mafatur, Stout Heart", Discovery, p. 88

Indifferent: neither opposes nor aids man
"A Vagabond Song", Adventures for Readers, Book 2, p. 493
"Stars", Adventures for Readers, Book 2, p. 499
"February Twilight", Discovery, p. 350

Immanent: a source of God
"The Earth is the Lord's", Adventures for Readers, Book 1, p. 411
"When I Consider Thy Heaven", Adventures for Readers, Book 2, p. 550
"Psalm 91", Discovery, . . 457

Reflecting Man's Mood: takes on man's moods
"The Last Rose of Summer", Adventures for Readers, Book 1
"The Daffodils", Adventures for Readers, Book 2, p. 490

Good: calls out best in man
"My Land is Fair for Any Eyes to See", Stuart
"Rain", Adventures for Readers, Book 2
"Climbing Kloochman", Discovery, p. 254
"Do You Fear the Wind", Discovery, p. 265
"Escape from the River of Wolves", Discovery, p. 285
"Taming der Eiger", Discovery, p. 302

Evil: calls out worst in man

Setting Moods: sources for writers
"Trees", Adventures for Readers, Book 1

Highway to God: purify the spirit

INTERPRETATIONS OF NATURE

A. Nature as Useful: a way to make a living, nature as useful: the farmer, the fisherman, the miner, etc.
B. Nature as Science: a source for all the mathematical, biological, chemical and physical laws. Newton, Boyle, Einstein, eminent biologists and physicists use this view.
C. Nature as Beautiful: a source for revealing beauty to man, a source for stimulating his aesthetic responses--the beauty of the rose, the sun on the water, and the green leaves of the tree.
D. Nature as Friendly: a source of refuge for the wearied, the melancholy, the hermit, the introvert, and for all those who seek a spirit which is always friendly and kindly.
E. Nature as Hostile: a source of disaster and catastrophe, a force by nature unfriendly to man--dust storm, drought and flood.
F. Nature as Indifferent: a source for a force which neither opposes nor aids man, a powerful entity completely indifferent to man and his wishes, dreams and desires.
G. Nature as Immanent: as a source of God. God is nature. Nature is divine and important as man (Whitman).
H. Nature as Reflecting Man's Mood: a source which always takes on man's moods, kindly or otherwise. A nature which adapts herself to the mood of the individual.
I. Nature as Good: a source which calls out the best in man, makes him moral, good and innocent (Blake-Rousseau).
J. Nature as Evil: a source for calling out the worst in man; that which keeps man from tending to his own spirit of mind (Puritans).
K. Nature as Setting Moods: a source for writers who attempt to induce a certain mood for their setting.
L. Nature as the Highway to God: a source to stimulate and purify the spirit with beauty so that the individual can establish himself on the right part to God and Heaven, a path of beauteous forms of nature as symbols of God's love (Gerard Manly Hopkins).

EXERCISE #6

Title of Lesson: Animal Stories and Poems

Purpose:

To help students enjoy literature where animals are the main character or directly affect the main character

Materials Needed:

1) Adventures for Readers, Laureate Ed., Books 1 and 2
2) High Trails
3) Widening Views
4) Any literature book

Activities:

Activities found suggested in texts, workbooks and individual study packets from the publisher.

ANIMALS: Stories

"Animals Go to School", Adventures for Readers, Book 1
"The Runner", Adventures for Readers, Book 1
"Out of the Heart", Adventures for Readers, Book 1
"Old Ben", Adventures for Readers, Book 1
"Snapshot of a Dog", Adventures for Readers, Book 1
"Rikki-Tikki Tavi", Adventures for Readers, Book 1

Poems

"Some Animals as I See Them", Adventures for Readers, Book 1
"On the Grasshopper and the Cricket", Adventures for Readers, Book 1
"The Runaway", Adventures for Readers, Book 1

Stories

"Old Yeller and the Bear", Adventures for Readers, Book 2
"Three Fables for Our Time", Adventures for Readers, Book 2, p. 38
"My Friend Flicka", Adventures for Readers, Book 2, p. 342

Poems

"Private Zoo", Adventures for Readers, Book 2, Ogden Nash

Stories

"Old Yeller", High Trails, p. 158
"The High Trail", High Trails, p. 180, animal behavior
"Blotto", High Trails, p. 197
"Range Finding", High Trails, p. 203

Stories

"Over the Fence", Widening Views, p. 64
"A Four-Footed Hobbyist", Widening Views, p. 280
"Starting w[illegible] a Roar", Widening Views, p. 293, attitude toward animals

EXERCISE #7

USING OUR ENVIRONMENT TO TEACH COMMUNICATION SKILLS IN THE JUNIOR HIGH ENGLISH CLASS

OBJECTIVES:

1) To help students become more consciously aware of their 5 senses in communications
2) To help students use this awareness in speaking and writing skills

Title of Lesson: Communication Through Observing

Purpose:

To show students that communication and learning can and does take place without words, particularly through observing pictures, scenes and actions

Behavioral Objectives: After completing these exercises, each student should be able to:

1) Find more than the face value in a picture
2) Find a message, thought or story in a picture, scene or silent movie
3) Draw some conclusions about a person or character in a story from the actions
4) Make associations, with or without patterns, in things observed or seen

Materials Needed:

Pictures: 1) Collections from students
2) Units 1 and 2 from Environmental Education Picture Packet, Bourbon County Schools Materials Center
3) Cartoons, especially ones on environmental education

Silent movies from students' collections

Stories: 1) "Out of the Heart", Adventures for Readers, Book 1, Laureate Ed.
2) "Old Ben", Adventures for Readers, Book 1

Poems: 1) "Once On a Solitary Walk", J. Stuart
2) "My Land is Fair for Any Eyes to See", J. Stuart, American Writers, 1943
3) "Now You Can Think of Autumn Biting Cold", American Writers

Activities:

1) Make a bulletin board of pictures and cartoons students bring in. Have a class discussion with these pictures: a) get main idea or theme of picture, b) begin noticing details such as expressions on faces (compare several), seasons in pastoral scenes and shades of colors.
2) Have class discussion with pictures from Environmental Education Packet. Unit I picture: pastoral scene a) appreciation of the out-of-doors, b) feeling of awe and admiration, c) certain areas have certain personal appeals, d) intrinstic worth beyond monetary value. Unit II picture: barren moon a) away from familiarity (appreciate what we take for granted), b) cannot support life, no air, water, food, wrong temperature, c) lack of things we enjoy such as form, color, weather, sound, life and growth. Begin idea of comparison by using these 2 pictures.
3) Show silent movie or cartoon: a) discuss story from observations (no dialogue), b) introduce time sequence in story.
4) Read stories listed, observing behavior in people who talk little.
5) Sit quietly in classroom observing people, outside activities, pictures, etc.
6) Hike to outdoor laboratory: a) sit and observe, b) take some notes to bring back to class and discuss what was observed.

Follow-up Activities:

1) Watch animal films on TV (Lassie), little dialogue.
2) Use graphys and tell the story from them.
3) Use illustrations in texts, what they show.
4) Observe and describe our environmental blessings.
5) Observe what you see while waiting for school bus or looking out your yard..

EXERCISE #7 (cont.)

Evaluation:

Have students, either orally or written, describe some action, scene or observations they have made in a given time or area and then grade.

EXERCISE #8

Title of Lesson: Communication Through Writing: Descriptive Paragraph

Purpose:

1) To show students that communication can and does take place through writing, particularly through descriptive paragraphs
2) To help students develop the use of color and sensory words in their vocabulary

Behavioral Objectives: At the completion of these exercises, students should be:

1) Identifying color and sensory words
2) Using color and sensory words in their descriptive writings

Materials Needed:

1) Discovery
2) Macmillan English Series, 7
3) Adventures for Readers, Book 1, Laureate Ed.
4) Journeys Into America, 1965 Ed.
5) Collection of articles to be displayed in room

Activities:

1) Read and discuss english text pp. 102, 103.
2) Use Journeys Into America, "Seeing and Listening as You Read" exercises.
3) Read stories and use workbook exercises to help students identify colorful expressions and words: a) "Kid Brother", Discovery text and workbook, b) "How a Chutist Feels", Discovery text, pp. 3336-3340; workbook, p. 82, c) "Won By a Hair", Discovery text, pp. 158-170; workbook and individual study book.
4) Using examples from our natural environment, make colorful and sensory descriptions in class orally.
5) Poems: a) "Laughing Song", Adventures for Readers, p. 384, b) "June", Adventures for Readers, p. 412.

Follow-up Activities:

Can be used any time during the year in literature or writing assignments.

Evaluation:

1) Take students outside and have them write a descriptive paragraph, making use of colorful and sensory words in their writing.

2) Have students identify at least 3 colorful or sensory words or sentences in their paragraph.
3) Do same as 1 and 2 only use a colorful picture in the classroom.

EXERCISE #9

Title of Lesson: Communication Through Writing: Comparisons

Purpose:

1) To show students that communication and learning take place by comparing items with each other
2) To teach students that when writing comparisons, they must discuss and describe all items being compared

Behavioral Objectives: After this exercise, a student should be able to:

Write a paragraph in which 2 or more items are to be compared with each item being discussed (working with physical appearance only)

Materials Needed:

1) Any collection of similar or related objects such as a) leaves, bark, nuts, b) 2 kinds of balls, fruits, etc., c) pictures of scenery, etc.
2) "Boy or Calf" poem, J. Stuart
3) Environmental Education Picture Packet, Bourbon County Schools Materials Center

Activities:

1) Make display of collections: a) large class display, b) individual displays on desks, c) grouping of pictures on transparency.
2) Discussion points: size, shape, color, texture, weight.
3) Use science or social studies texts for comparable items.
4) Visit outdoor laboratory and compare leaves, bark, etc.
5) Read poem, "Boy or Calf" and discuss comparison made by poet.

Follow-up Activities:

Repeat any of above throughout year, especially comparing items in other texts and studies.

Evaluation:

1) Use Unit III picture from Environmental Education Picture Packet.
2) Have students observe and then write comparisons from the 2 scenes pictured.
3) Grade or read orally to classmates.

BOY OR CALF

How would you like to be a little calf
Who knows his mother for a time so brief,
Born and orphaned and a homeless waif
Between the birth of bud and fall of leaf?
Would you have fun among your cattle kind
To have an owner feed you scanty fare
Or plenty for a purpose? Would you mind
To live life's episode without a care?
How would it be after your breathing air
Fresh from the valley, mountain, western plain
On a crowded car to the cattle market where
You could not feed on sweet grass, feel the rain
And sleep on misty meadows under stars,
Never again to have dreams in your head
Of the world beyond your fence and pasture bars?
Now, would you rather be a boy instead
To have your world unfenced, to play and laugh
In life's great episode of fun and joy?
Have you ever heard of a laughing calf?
Have you ever known a bawling boy?

EXERCISE #10

Title of Lesson: Communication Through Touch

Purpose:

1) To teach students that we learn by touch
2) To help students become more conscious and aware of the texture of things

Behavioral Objectives: At the close of this exercise, students should be able to:

1) Be blindfolded and describe articles by touch only
2) Be blindfolded and identify articles by feeling them

Materials Needed:

1) Sack or box full of familiar objects
2) Collection of nature objects: bark, moss, buckeyes, cones, nuts, fern fronds, etc.
3) Blindfolds
4) Macmillan English Series, 7, ch. 6, "Explanations and Descriptions"

Activities:

1) Blindfold a student and have him orally describe objects in the box for the class.
2) Blindfold several students, each student takes one object, feels it, returns it to the box, and then writes his descriptive paragraph about it and tries to identify it.

EXERCISE #10 (cont.)

Evaluation:

Exercise #2 in Activities, with different type objects.

EXERCISE #11

Title of Lesson: Communication Through Listening

Purpose:

To sharpen the student's sense of hearing consciously

Behavioral Objectives: After these exercises, the student should be able to:

1) Find and hear patterns in sounds
2) Identify some background sounds that are heard everyday but not noticed by the untrained ear

Materials Needed:

1) Outdoor laboratory
2) Records: "Night on Bald Mountain", "1812 Overture", and "Bird Calls" (from Bourbon County Schools Materials Center: "Bird Calls" only)
3) Record player
4) Tape recorder
5) Rainy day
6) Windy day

Activities:

1) In the classroom, first begin to sharpen the student's sense of hearing by just listening to school and classroom sounds.
2) Use tape recorder to tape sounds: play in class, listen and discuss.
3) Use a record of instrumental music, discuss mood, patterns, etc.: "Night on Bald Mountain", "1812 Overture".
4) Visit outdoor laboratory: sit and just listen for sounds of nature, make list of sounds that can be identified.
5) Use record of "Bird Calls" and listen for patterns.

Follow-up Activities:

(Any of the above)

Evaluation:

1) Use record, tape of trip to out-of-doors to listen to sounds.
2) Write a paragraph on sounds heard then grade looking for evidence of sensitive listening.
3) Report orally to class on sounds heard on tape, record or trip.

EXERCISE #12

Title of Lesson: Communication Through Speaking: Oral Report

Purpose:

1) To improve the student's ability to speak to his classmates
2) To increase his sense of time sequence in reporting events
3) To use descriptive words in his reporting

Behavioral Objectives: After this exercise, each student should be able to:

1) Give an oral report with correct time sequence
2) Use descriptive phrases in his writing and reporting

Materials Needed:

1) Macmillan English Series, 7, ch. 7, "Writing a Report"--sec. 5, Taking Notes; sec. 6, Making an Outline for Your Report: ch. 11, "Speaking and Listening"--sec. 7, What is a Good Talk?; sec. 9, Organizing Your Talk; sec. 10, Giving Your Talk
2) High Trails, "Making Friends with Verdi"

Activities:

1) Go on nature hike to outdoor laboratory, take notes on actions and things seen. Organize notes for talk. Give talk to class.
2) Read story, "Making Friends with Verdi".

Follow-up Activities:

Stories with time sequence patterns:
1) "Four Boys and a Dog", Discovery text, pp. 322-334; Individual Study Booklet, p. 64.
2) "How We Live in Tunis, Tunisia", Discovery text, pp. 60-64; Individual Study Booklet, p. 13.

Evaluation:

Give talk to the class:
1) A vacation report with time sequence
2) A story report
3) A how-to-do something report

SCIENCE EXERCISE PLANS

Incorporating Environmental Studies

JUNIOR HIGH SCHOOL LEVEL

Sources Consulted in Developing:

Conservation Education 577 Materials
Dr. William Householder
Eastern Kentucky University

Environmental Education
Paducah Public Schools

Southeastern Pennsylvania Outdoor Education Materials Center
Sycamore Mills Road
Media, Pennsylvania

Outdoor Education
Beloit Wisconsin Public Schools

Compiled by:

Mrs. Glenda Brinker
Science Teacher
Bourbon County Junior High School
Paris, Kentucky 40361

EXERCISE #1

Title of Lesson: Scientific Effects and Consequences of Man's Modification of the Environment

Purpose:

To help students recognize the changes man has made in the environment and the consequences that have resulted from these changes

Behavioral Objectives: After completing the study of this lesson, the students should be able to characterize the changes and results in:

1) A burned area
2) A river receiving wastes
3) A cultivated field
4) A housing development
5) A strip mine
6) A forest preserve
7) An industrial area
8) A highway system
9) A canal or waterway
10) A reforested area
11) A crop treated with pesticides
12) A nuclear testing ground
13) A reclaimed swamp area

Materials Needed:

1) Pictures
2) Charts

Activities:

1) Display several pictures of undisturbed or wilderness areas such as a forest, stream, swamp, or grassland on one side of a panel; then, in contrast, on another side, show pictures of cultivated land, bridged river, industrial area, residential area, highways, processed foods, mining area, clothing, etc. A third group can show erosion of land, a burned forest, polluted stream, dead wildlife, desert land, flooded area, population crowding, air pollution, etc.
2) Choose students to describe the pictures (one group at a time). Then follow with these questions: a) Where might one find such areas?, b) Which pictures show the original environment?, c) How old is this environment?, d) What has brought about the differences in groups one and two?, e) What has brought about the changes in groups two and three?, f) Have the changes always been necessary?, g) Have the changes always been beneficial to man?, h) What will be the result of continued change?, i) What must be considered in any changes in the environment?
3) Have the students characterize the changes and results in: a) a burned forest, b) a river receiving wastes, c) a cultivated field, d) a housing development, e) a strip mine, f) a forest preserve, g) an industrial area, h) highway system, i) a canal or waterway, j) a reforested area, k) a crop treated with pesticides, l) a nuclear testing ground, m) a reclaimed swamp area.

Follow-up Activities:

Have the students justify or reject the following:
1) Wise use of the environment is the responsibility of every citizen.
2) The way one resource is used or abused may affect other resources.
3) The search for new resources to replace depleted resources should be continued.
4) Limiting or reducing waste is vital.
5) Legislation is more effective than education of citizens.

Evaluation:

"Man is the sole organism that can consciously modify his own environment." Are the students able to give at least 10 examples to justify this statement?

Reference Materials:

1) Conservation in the People's Hands, American Association of School Administration
2) Future Environments of North America, Darling, F. F. and Milton, J. P.
3) Conserving American Resources, Parson, Ruben L.
4) "The Changing Cotton Land", film, Deroch, Southeast U.S.A., b/w, 20 min.
5) "The Conservation Road", film, TWCF, b/w, 18 min.
6) "Seeds of Destruction", film, EBF, color, 10 min.

EXERCISE #2

Title of Lesson: The Effect of Light on Plant Growth

Purpose:

To help pupils investigate the effect of light on green plants

Behavioral Objectives: The students should be able to:

1) Tell what happens when green plants are taken away from their light source
2) Tell what makes a radiometer spin
3) Demonstrate whether or not light affects plants

Materials Needed:

1) Bright light (lamp)
2) Radiometer
3) Soybean
4) Salvia
5) Clover
6) Lettuce
7) Coleus
8) Petunia

Activities:

1) Place a radiometer and a green plant on the desk. Hang a light over them. Turn the light on, then off.
2) Answer the following questions:
   a) What happens to the objects on the desk when the light is turned off?
   b) What makes the radiometer spin?
   c) What effect does the light have on the plant?
   d) How does the plant use the energy of the sun?
   e) How can you determine whether or not light affects plants?

(Note to teacher: Pupils will probably suggest that some be placed in a dark box or room. Others might suggest covering a leaf or a part of a leaf to prevent light reaching it. Carry out these suggestions. Test for starch in the leaves not covered, leaves covered, and leaves placed in darkness.)

3) Heat the leaves in hot alcohol until all the green coloring matter is removed (be sure to heat the alcohol in a hot water bath. Do not heat alcohol over a flame, as it may ignite). Place in diluted iodine solution. What effect does light have on photosynthesis? How would plants react to continuous light? Do all plants need the same amount of light for growth? Use a wooden box. (The size and number of potted plants will determine the size of the box.) Paint the inside black. Place a metal tray inside this box on a thin layer of dry sand. Place one each of the suggested plants in the tray. Use a cardboard box painted black inside to cover the wooden box. Be sure no light can enter this enclosure. The night length period must be total darkness. Fit the box over the plants at the end of the school day--uncover on arrival next morning. Keep a careful record of the growth of leaves, stems, flowers, and fruit development. One each of the same plants is kept in normal classroom environment. One each is kept in continuous light. Compare growth.

Follow-up Activities:

1) Visit a florist. Make plans in advance so that he will emphasize this phase of plant growth.
2) Assign individual study at home for the interested pupil. Using a black or opaque bag, he may cover a part of the green plant.

Evaluation:

Living things reproduce themselves and develop in a given environment. The students can describe what happens to green plants when they are taken away from their given environment, and define a radiometer.

EXERCISE #3

Title of Lesson: Planting Trees and Shrubs

Purpose:

1) To translate conservation principles into practices

2) To develop an appreciation of living things
3) To provide food and shelter for area wildlife
4) To participate directly on school site or land lab development, and to understand its purposes

Behavioral Objectives: After completing the exercise, the students should be able to:

1) Plant a tree or shrub correctly
2) Display an appreciation for living plants

Materials Needed:

1) Planting stock (such as those received in the wildlife packets distributed through the Soil and Water Conservation Services and the Division of Wildlife of the Kentucky Department of Natural Resources and local nurseries)
2) Shovels
3) Buckets
4) Stakes
5) Soft twine

Activities:

1) Plant trees and shrubs
2) The tree-planting activity might be covered for the school newspaper as part of a School Journal class. If Journalism is not a scheduled school subject, newspaper reporters can provide a newspaper account. If possible, pictures should be included, thus using the photographic talents of one or several students.

Follow-up Activities:

Continuous care for the planted trees and shrubs and observations made concerning the rate of growth.

Evaluation:

1) The students are able to translate conservation principles into practices.
2) By observing the product of their work, the students develop an appreciation of living things.
3) The students are able to participate directly on school site or land lab development and to understand its purposes.

PLANTING

Unpack the planting stock as soon as possible. If planting cannot be done when the plants are unpacked they should be "heeled in". This, in effect, amounts to digging a shallow hole, arranging the plants with the roots spread out in the hole and covering the roots with the soil previously removed from the hole. Wet down the "heeled in" area to settle the soil around the roots.

When ready to plant, you will need a digging tool, a container such as a pail or kettle, a source of water, and a crew of two or three with each group.

Place some of the plants in the container and fill with water deep enough to cover the roots. The muddier the water, the better protection for the roots of the plant. If the roots are accidentally exposed to air, the muddy water will put a protective coating of soil on the roots. This protection lasts for a matter of minutes--not hours.

Evergreens, especially, are vulnerable to root drying as their "sap" in the form of resin hardens when exposed to the air after only a short time. Once hardened, this resin, or "pitch" is impervious to water. This prevents the roots from absorbing water. Death through drying out then follows quickly.

When planting small plants up to three feet tall in sod or a thick weed area, scalp off an area twice as wide as the root spread of the plant. This means "skinning off" to a depth of about three or four inches. This is most easily done if the spot to be scalped is first cut on the edges. A shovel or spade can then be used to peel off the spot.

Next, dig the hole making sure that its volume is at least half again as large as the root spread of the plant. Crowding and jamming the roots in can result in a root-bound plant and poor growth.

Place the plant in the hole so that it is at about the same depth as it was growing before. You can generally tell this by a soil mark on the stem or trunk or by the difference in texture of the bark between root and stem.

Half fill the hole with loose soil. Mixing a little of the top soil in with the other soil around the roots is helpful in getting the root system off to a good start. Do not mix fertilizer in with the soil. This can cause chemical burn of the roots. With the hole about half filled with soil, put in enough water to saturate this replaced soil. The purpose is not so much to water the plant as to settle the soil around the samll roots and exclude air pockets in which roots could dry out.

Now fill the hole with soil until level with the surrounding ground and water again. As this water soaks in, it will settle the soil creating a slight depression. This is desirable because it will act as a catch basin for rain water. A light covering (two inches) of loose mulch such as a peat moss, ground corn cobs, or leaves, can be placed around the plant. This mulch will moderate extremes of temperature at the soil surface.

Trees or shrubs that are top heavy should be staked with one or three stakes to prevent being blown over. Drive the stakes into solid ground either outside the dug up area or down through the replaced soil into solid soil. Tie the tree to the stakes with a soft twine. Place a piece of split garden hose or small strips of wood between the twine and the tree stem to prevent the twine from rubbing through the bark. If twine is not available, rag strips could be used.

To minimize the danger of being mowed off, all plants should be marked with a location stake that stands 2 feet above the ground. Place this stake close to the plant (about six inches from the plant stem). Paint the top three inches of the stake white to make it more easily seen by the mowers. If the stake is flat (not square or round in cross-section) place it so that the stake parallels the root pattern and not across the root to avoid cutting the roots as you drive the stake.

The first year after bing transplanted is the most critical to the plant. Water is the most important need. If leaves start to droop or

shrivel, water thoroughly. Two gallons of water once in a week is far better than a total of three gallons spread over six different waterings in a week's time. Unless there has been a rainy Fall, thoroughly water transplanted stock in late October to carry them through the Winter. This is especially necessary for evergreens.

Fertilizer is not usually recommended until the second year when the root system has redeveloped to some extent. If fertilization is deemed necessary the first year, use a weak liquid solution and not dry fertilizer.

EXERCISE #4

Title of Lesson: What Good are Insects?

Purpose:

1) To point out the many ways insect life benefits man
2) To demonstrate the interrelationship of all living things
3) To gain a greater appreciation of a more positive attitude toward insects

Behavioral Objectives: Students should be able to:

1) Define a pollinator
2) Describe how insects are necessary in cross-pollination
3) Name 5 insects that burrow in the soil
4) Explain how burrowing and digging help the soil and plants
5) Give 4 examples of scavengers
6) Name 2 insects that are manufacturers

Activities:

1) Set up before the class the questions: What good are insects?, Could man survive without them? Suggest that a trip be made into the field. This will enable the class to answer with more certainty.
2) Look for examples of these categories and discuss each:
   a) Pollinators: How necessary are insects to cross-pollination, especially the honey bee? What foods might we have if there were no insects to pollinate? How would the quality of the meats we eat be affected by the lack of insects? Would we have cover crops to prevent erosion without the help of insects?
   b) Soil Conditioners: What insects burrow in the soil? How does this burrowing and digging help the soil and plants?
   c) Scavengers: What evidence do you see of insects breaking down the decaying stumps and logs in our area? How does this help the soil? How are insects and dead animals related?
   d) Manufacturers: What about the use of insects to make dyes, resin, silk and honey? What insects are used in manufacturing and what are some of the end products?
   e) Food: What animals, including man, use insects for foods? How would birds be affected by the disappearance of insects? What about our fish, frog and turtle population?

Follow-up Activities:

Bring in the concept of ecology. An entire unit can be built around the balance of nature and the placement of plants and animals in this scheme.

Evaluation:

1) Have the students increased their observation skills?
2) Are the students able to describe how insects are necessary in cross-pollination?
3) Can the students name 5 insects that burrow in the soil?
4) Can the students identify at least 4 scavengers?
5) Are the students able to name 2 insects that are manufacturers?
6) Do the students understand the meaning of pollination and its importance?

Reference Materials:

1) What Good are Insects, Audubon Nature Bulletin
2) How Insects Benefit Man, Audubon Nature Bulletin
3) Audubon Ecology Study Program

EXERCISE #5

Title of Lesson: Food Webs

Purpose:

To help students understand food chain and webs

Behavioral Objectives: After completing this activity, the students should be able to:

1) Describe the effect of destroying one species in a food web
2) Describe the efficiency of a food web as a self-sufficient unit
3) Describe the effect of over-production of one species in a food web
4) Describe what would happen if suddenly the number of producers in a food web decreased

Activities:

1) Field trip to Bourbon County Schools Environmental Education area:
   a) Investigate macroscopic and microscopic organisms and the place of each in the food web after you have studied the pond. Compile and record observations.
2) Working in two groups, have the class study the organisms in the litter and in the soil. Studying the litter: gather samples of litter to be taken back to the laboratory where it can be studied. The students responsible for this will need the followimg materials: 4 or more plastic bags, rubber bands, glass-marking crayons, wire circle, trowel, and millimeter scaled ruler. Before the field work, plastic bags should be labeled with the team number and the date of the field collection. The wire circle is used to mark out the area from which the loose litter is to be scraped. Since the area of the circle is known, the density of the organisms in the sample can be

computed. Each sample of litter should be placed in a separate plastic bag and the mouth of the bag tightly fastened by the rubber band. After litter has been removed, use the ruler to mark out a square 10 cm. on a side, and with a trowel, dig up the sample of the soil in the square to a depth of 1 cm. Place the soil sample in a separate plastic bag and fasten with a rubber band.

3) Discuss the following questions: What would be the effect of destroying one species in this web?, What would be the effect of over-production of one species in this web? How is the food web a self-sufficient unit?, What might happen to the balance of nature in a pond community if one kind of organism suddenly increased or decreased?, Would any of the changes that occur be permanent?, Would it make any difference if the expanding population were an algae (producer) or a fish (consumer)?

Follow-up Activities:

Construct other food webs that you observe in your backyard or school yard using pictures or names and arrows to indicate producers and consumers. (For the students.)

Evaluation:

"Organisms furnish matter and energy for each other." Have students explain.

Reference Materials:

1) The Sea Around Us, Carson, Rachel
2) Ecology and Field Biology, Smith, R. L.
3) "The Community", film, color, 11 min., EBF
4) "A Way of Life", film, color, 28 min., MOCC

EXERCISE #6

Title of Lesson: Wilderness

Purpose:

To help students appreciate the value of the preservation of wilderness areas (value to the individual, to science, and to their cultural heritage)

Behavioral Objectives: The students should be able to:

1) Give 4 examples of how the loss of wilderness affects wildlife
2) State 5 ways that visitors to a wilderness area contribute to its destruction
3) Give 6 ways that wilderness areas are important to m[illegible]

Materials Needed:

1) Audubon Magazine, NAS (National Audubon Society)
2) Wildlife, NWF (National Wildlife Federation)
3) "Wildlife Trail", film, USFS, color, 15 min.

Activities:

Discuss:
1) How has the loss of wilderness affected wildlife?
2) How has it affected particular animals?
3) What other effects have you observed?
4) What changes have you noticed in other trips you have made?
5) How can too many visitors contribute to destruction of the wilderness?
6) How can you contribute?
7) How are wilderness areas in remote sites important to you, even though you may never visit these areas?

Have the students read and find out what the following have contributed to conservation of wilderness:

1) Gifford Pinchot
2) John Muir
3) John Marshall
4) Howard Zahnizer
5) Justice William O. Douglas

Have the students investigate controversies over additions to our national wilderness system.

Follow-up Activities:

Have the students write for additional information on this subject. Suggested sources are:

1) Wilderness Society, Washington, D. C.
2) The Sierra Club, San Francisco, California
3) U. S. Forest Service
4) National Park Service

Evaluation:

"Man needs the wilderness and natural areas for recreation, as well as for their scientific value." Are the students able to describe in detail how man needs the wilderness and natural areas, not just for recreation, but for their scientific value?

Reference Materials:

School Library

EXERCISE #7

Title of Lesson: Ecological Succession: Plant Communities

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Identify a plant community
2) Distinguish between deciduous and evergreen trees

3) Distinguish between woody and herbaceous plants
4) Identify lichens
5) Identify mosses
6) Identify ferns
7) Identify fungi
8) Identify grasses
9) Distinguish different water plants
10) Point out and count the different kinds of plants in a given area
11) Tell the steps in bare rock succession from the rock to the hard wood forest

Materials Needed:

1) A designated area of study
2) A list of symbols to represent the kinds of plants you find
3) A list of terms for each student which includes the following: community, ecology, succession, herbaceous plant, perennial plant, deciduous, evergreen, litter, abundance, deciduous woody plants (more than 10 ft. tall), deciduous shrub or bush (less than 10 ft. tall), evergreen woody plants, grass and herbaceous vegetation, moss plants, fern plants, and fungi
4) Pencils and paper

Activities:

1) A Land Community: Plant Succession. The purpose of this activity is to examine the competitive and cooperative relationship that exists among the living things in a small area. We want to measure the abundance of the different kinds of plants found in the community. Each student will make a map of the designated area, using symbols to represent the kinds of plants found. The students will count the number of the largest plants and draw in a symbol to represent each one where they were seen growing in the community. Do not attempt to count all the grasses, but put symbols in the grass area.
2) A Still Water Community: a Small Pond. The purpose of this activity is to examine the competitive relationship that exists among the plants found in a pond. Each student will describe the appearance--size, color, structure--of the plants found: a) floating on the surface of the water, b) below the surface, c) on the bottom (use weighted line and hook), d) do you see plants growing up out of the water? what kind?, e) are all water plants the same?, f) how are they different?, g) do you see any animals attached to the plants? h) how do the plants living on the bottom of the pond get sunlight?
3) A Bare Rock Community. The students will compare the kinds of plants found growing on rock surfaces represent the first stage (primary) of plant succession.
4) A Moss Community. The students will compare the moss plants with the kinds of plants found in the water and with the lichens found on the rocks.
5) A Fern Community. The students should compare the fern community with the moss community. The students should be able to establish the differences and similarities, if any.

6) Open Field Community. The students will observe small seed plants establishing themselves and making a soil condition suitable for "higher" form of plants--the flowering, woody trees.

Follow-up Activities:

The students will compare other plant communities with the area that was designated by the teacher.

Evaluation:

1) The students are able to identify a plant community.
2) The students can distinguish between deciduous and evergreen trees.
3) The students can distinguish between woody and herbaceous plants.
4) The students can identify the following: lichen, mosses, ferns, fungi, grasses, and they are able to tell the steps in bare rock succession from the rock to the hardwood forest.

Reference Materials:

Bourbon County Schools Environmental Education Area

EXERCISE #8

Title of Lesson: Study of Mammal Signs and Habitats

Behavioral Objectives: At the conclusion of these activities, the students should be able to demonstrate their skill in observation in the out-of-doors by:

1) Locating 8 mammal signs
2) Identify at least 2 mammals on the basis of homes
3) Identify at least 4 mammals on the basis of tracks
4) Locate and identify at least 2 mammals on the basis of teethmarks

Materials Needed:

1) Plaster of paris
2) Cardboard strips
3) Paper and pencils
4) Chart of animal tracks

Activities:

1) Burrows. What is its diameter? Emphasize that it is important to know the diameter in order to theorize as to what type of mammal might use that burrow. Does the burrow have two or more entrances? What other signs do you find near the burrow, if any? Explain that this is extemely important in order to get a more definite identification of the mammal which is using this burrow. Does it appear to be active? Is it on a hillside near the woods or is it in a flat open field? Explain that some mammals prefer to have their homes on a hillside while others prefer the open field.

2) Homes Above the Ground. These are homes classified as terrestrial, aquatic, or arboreal. Terrestrial would be homes in brush piles, rock crevices, etc. Aquatic would be homes in the water. Arboreal would be homes high above the ground (in trees).
3) Food Stores. Where is the food store found? A hollow tree, buried in the ground or elsewhere? What is in the food store? Are there any other signs near the food store?
4) Teethmarks. Where are they found? tree trunks? nut hull? elsewhere? Would you say the animal was large or small and why? Explanation: You might find teethmarks in the trunk of a tree where a beaver has been working. You might point out to the children after they had expressed their views that by the height from the ground, that these teethmarks on the tree would more than likely be a small mammal.
5) Tracks. By using a chart, you can identify the tracks. Does there seem to be only one animal of the kind in the area or does there seem to be many? Explain to the students that they need to check for tracks of different sizes and numbers. Draw the track.

Follow-up Activities:

When weather permits, make a plaster print of several different tracks. Explain that they need to select a clear track and remove all debris such as sticks, leaves, etc. from the track being very careful not to destroy the track. Place twigs or cardboard strips around the track.

Evaluation:

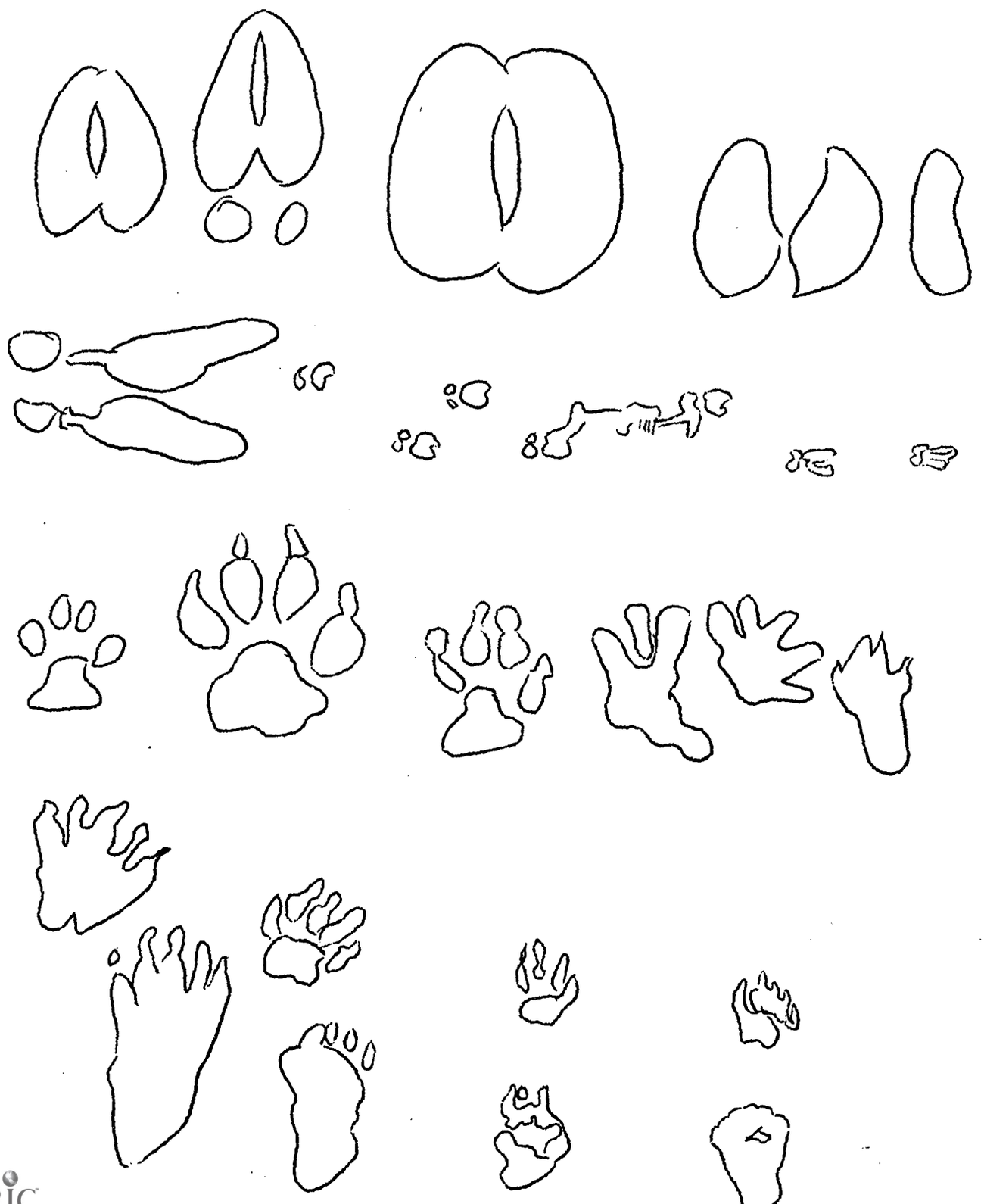
1) Are the students able to recognize 8 mammal signs?
2) Can the students identify at least 2 mammals on the basis of homes?
3) Can the students identify at least 4 mammals on the basis of tracks?
4) Can the students identify and locate at least 2 mammals on the basis of teethmarks?

Reference Materials:

"Animal Track Chart"

..EXERCISE #8..

Animal Tracks



Title of Lesson: Wildflowers: Conservation

Purpose:

To help the students discover, explore, and be aware of the richness of our natural environment, and their responsibility to preserve it for following generations.

Behavioral Objectives: After this exercise, students should be able to:

1) Define a wildflower
2) Explain how the wildflower is adapted for survival
3) Name one great enemy of the wildflower
4) Name 2 wildflowers that form a ground cover and help prevent soil erosion

Materials Needed:

1) Hand lens
2) Nature trail
3) Guest speaker
4) Handbook on wildflowers

Activities:

1) Guest speaker: ask a member of the Conservation Committee or the local Garden Club to speak to the class about wildflowers that are in this area. Ask the speaker to stress the wildflowers that are scarce and that should be left to grow.
2) Take a field trip to an area where some wildflowers may be found. Discuss the following: a) how many various flower parts does the wildflower have?, b) what are their positions?, c) are they jointed or separate?, d) what is the shape of their leaves?, e) what is one great enemy of the wildflower? fire, because it destroys and burns up humus in soil, f) discuss poisonous wildflowers (berries, bulbs, leaves, seeds, stems, roots).
3) Make a chart listing a) wildflowers to protect and save, b) wildflowers which may be picked up in moderation, c) wildflowers which may be picked freely.

Follow-up Activities:

Have the students find out what is being done in your state, and in the nation, to encourage preservation and conservation of our wild plants.

Evaluation:

1) Can the students identify a wildflower?
2) Are the students able to explain how wildflowers are adapted for survival?
3) Can the students identify wildflowers that form a ground cover and help prevent soil erosion?

Reference Materials:

Wildflower Handbook

Title of Lesson: Selective Crops: Greater Food Yield for a Growing Population

Purpose:

To help students understand the need for greater food yield, the importance of growing selective crops that provide high nutritive content to feed the growing population of the world, and the continued search for new food supplies and sources.

Behavioral Objectives: At the conclusion of these activities, the students should be able to:

1) Give 4 reasons why the production of food is becoming a major problem
2) Name 5 countries that have deficiencies in their diets
3) Discuss the reasons that these countries have deficiencies in their diets
4) Tell why it is important to try new foods when they are served
5) Explain how you can be undernourished even though you eat 3 meals a day
6) Name the nutrients that the body requires
7) Describe what happens to the body when it does not get the nutrients it needs
8) Name 5 diseases that are associated with an inadequate diet

Materials Needed:

1) Rice
2) Dried beans
3) Newspapers
4) Magazines
5) Resource books

Activities:

Display on the demonstration desk these 2 foods: rice and dried beans:
1) Which one of these would provide the most protein in the diet?
2) Which one would you choose? why?

Developing the concept:
1) Why is production of food becoming a major problem for the world?
2) What countries have deficiencies in their diets?
3) What are the reasons for these deficiencies?
4) Why will some of our familiar food crops eventually be replaced by others?
5) Why is it important for students to try new food when it is served?
6) How would you be undernourished even though you eat 3 meals a day?
7) What are the nutrients that the body requires?
8) What foods provide these nutrients?
9) Why should we try to eat these foods every day?
10) What happens when the body does not get the nutrients it needs?
11) What diseases are associated with inadequate diets?

Follow-up Activities:

Have the students investigate the food crops grown in the community:
1) What are these crops?
2) What nutrients do they contain?
3) How much of each crop is grown?
4) In how many ways is this food used?
5) What has been done by your agriculture department to improve this crop?

Evaluation:

1) Are the students able to understand that you can starve even though you eat 3 meals a day?
2) Can the students name the nutrients that are required by the body?
3) Do the students know at least 5 diseases that are associated with an inadequate diet?

Reference Materials:

1) Conserving American Resources, Parson, Ruben
2) Plant Disease Handbook, Westcott, Cynthia

EXERCISE #11

Title of Lesson: Life and Oxygen Concentration

Purpose:

To determine oxygen concentration in different environments and to determine the effect various oxygen concentrations have on fish or any aquatic animal

Behavioral Objectives: At the conclusion of this inquiry, the student will be able to:
1) Recognize aquatic producers of oxygen
2) Determine the concentration of oxygen that is required by aquatic animals

Materials Needed:

1) 3 glass gallon jars
2) 2 aquatic plants
3) Black tape
4) 3 similar aquatic animals

Activities:

Procedure: Take the 3 gallon jars and fill them with water from the same source. Measure the oxygen concentration in each container. Cover the #1 gallon jar with black tape. Place a plant in it. In the #2 container, place an identical plant to the one you used in

container #1. Water will be the only item in container #3. Place all 3 containers in the sun. After the containers have been in the sun for 6-12 hours, measure the oxygen concentration in each container
Questions: Why does the concentration vary?, Which container has the most concentration of oxygen? Why?
Put one of the three similar aquatic animals in each container. Observations should be made for approximately 30 minutes. Record your observations. Explain the reactions in each container.

Evaluation:

1) Can the students recognize aquatic producers of oxygen?
2) Are the students able to determine the concentration of oxygen that is required by aquatic animals?

Reference Materials:

1) Textbooks
2) Encyclopedias

EXERCISE #12

Title of Lesson: Weather

Purpose:

1) To practice observation skills
2) To show cause and effect relationships and to illustrate how predictions are possibly based on recurring elements of daily weather conditions
3) To encourage pupils to give verbal reports to an audience
4) Practice the use of weather instruments

Materials Needed:

1) Barometer
2) Wind direction indicator
3) Wind speed indicator
4) Thermometer
5) Hygrometer (relative humidity indicator)

Activities:

1) Observe cloud types over several days.
2) Record weather data as indicated by weather instrument.
3) Student reports.

Behavioral Objectives: At the conclusion of these activities, the students should be able to demonstrate their skill in observation by:

1) Describing the cause and effect relationships and how predictions are possibly based on recurring elements of daily weather conditions

2) Work with weather instruments
3) Identify the different cloud types
4) Define the following terms: barometer, wind direction indicator, wind speed indicator, thermometer, hygrometer

Follow-up Activities:

Evaluate the observations the students made concerning the cloud types and the weather data.

Reference Materials:

1) Brooks, Charles Franklin, Why the Weather?, New York, Harcourt, Brace, Chapter VIII, "Some Weather Proverbs", relating to the summer months and Chapter XIX, "Autumn Weather Proverbs", illustrating what parts of our weather proverbs are fact and what parts are fable
2) Fisher, Robert Moore, How About the Weather?, New York, Harper, introduces each chapter with humor and thought provoking material; the first 2 chapters on the history of predicting weather are delightful; the appendix is excellent
3) Slone, Eric, How You Can Forecast the Weather, Greenwich, Fawcett Publications, Inc.

EXERCISE #13

Title of Lesson: Constructive Chemical Changes in Matter

Purpose:

To help pupils understand how conservation of coal and other matter such as wood and mineral compound can be practiced by the breaking down of the compounds into simple substances

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Name 5 by-products of coal
2) Explain what happened in the tubes
3) Give 2 examples of other uses of this demonstration
4) Name the type of change that takes place in destructive distillation of coal
5) State 10 examples of chemical changes in matter that produce useful products

Activities:

Laboratory Experiment by the Students: Set up apparaturs for destructive distillation. After the students have completed the destructive distillation of coal, have them answer the following questions:
1) What happened in the tubes?
2) What type of change is this?

3) When can we make use of this demonstration?
4) How has technology enabled us to use this type of chemical change to save our resources?
5) What is the use of the original coal, now charcoal?
6) What are the uses of the by-products?
7) How have these reclaimed gases become "substitute" products?
8) What do they add to our total resources?
9) What do we know is in the coal?
10) Will this be available for acids or fertilizers?

Follow-up Activities:

Investigate other compounds such as in the metallurgy of iron, aluminum, and galena; which would produce useful by-products?

Evaluation:

"Chemical changes in matter produce useful products." Have the students explain.

Reference Materials:

Flow charts of products derived from coal; available from U. S. Steel Corporation

EXERCISE #14

Title of Lesson: White-Disc Test for Water Pollution

Behavioral Objectives: The students, upon completing this exercise, should be able to:

1) Conduct a simple test for water pollution in any desired body of water
2) Compare the discoloration of water in the same general area
3) Recognize and name possible signs of water pollution
4) Explain why the degree of pollution will vary in different areas of the same body of water

Materials Needed:

White-disc connected with long stick which is marked in units of length

Activities:

While holding the disc apparatus by the stick, push it down into water until the disc is no longer visible. Take a reading on the graduated stick and record. After repeating this in several places, make comparisons of visibility of water bodies. Also, make comparisons of different areas in same pond or lake.

Follow-up Activities:

Instruct the students to test other bodies of water for pollution. They should compare the different degrees of pollution.

Evaluation:

1) How do you recognize possible signs of water pollution?
2) The degree of pollution will vary in different areas of the same body of water.

EXERCISE #15

Title of Lesson: Chemicals in the Environment

Purpose:

1) To help students gain a better understanding of chemicals used in the environment
2) To help students recognize that chemicals must be used with care

Behavioral Objectives: After completing the lesson, the students should:

1) Identify 5 chemicals that are used by the housewife
2) Describe what would happen if several of these products are combined
3) List 4 chemicals that the household uses with poison or caution on their labels
4) Discuss why every home should have a list of antidotes posted in a convenient place

Materials Needed:

1) Various bottles and cans that have contained household products
2) Consult Readers Guide for current publications
3) Materials can be secured from local Health Department

Activities:

1) Have on the demonstration desk some of the following (empty): a box of detergent, bottle of household cleaner, bottle of furniture polish, can of cleaning fluid, can of paint remover, bottle of bleach, bottle of aspirin, can of gasoline, bottle of ammonia, prescription medicine box, can of insecticide.
2) Ask the following questions: a) What are these products?, b) Have you used them?, c) How have you used them?, d) Why do you use them?, e) What is their purpose?, f) Why should we always read the labels before using them?, g) What could happen if several of these products are combined?, h) What are these products made of? (On the last questions, the teacher can stress the point that we cannot always tell what is in a product; therefore, it is vital that we use it only as directed.)
3) Assign these investigations: a) Count and list the number of different kinds of cleaners or pesticides found in the home., b) How many of these have poison or caution on their label?, c) How many of them are supposed to be used in a well ventilated place? Why?, d) Which ones are labeled inflammable?, e) Which ones indicate

they are not to be mixed with other chemicals?, f) Which ones indicate that they should not come in contact with the skin?, g) How many of them have an antidote given on the label?, h) Why should every home have a list of antidotes posted in a convenient place?, i) What should be done if a person accidentally swallows a poisonous substance?

Follow-up Activities:

After the students have reported their findings, have them make a list of safety rules to follow concerning the use and storage of these products.

Evaluation:

"Chemical substances used to keep the environment free from contamination and pests can result in harm to the environment." Have the students give at least 10 examples of how chemical substances that are used by man to free the environment from contamination and pests result in harm to the environment.

Reference Materials:

1) Newspapers
2) Magazines
3) Books

25 Ways You Can "Give Earth a Chance"

1. Keep your car tuned.
2. When buying a car, make sure it has an anti-smog device.
3. Use city transportation facilities whenever possible.
4. Ride a bicycle or walk whenever possible.
5. Use white tissues (the dyes are harmful in colored tissues).
6. Cut out or cut back the use of fertilizer, herbicides, pesticides.
7. Do not use any kind of plastic wrapping (baggies, saran wrap, etc.)
8. Buy your milk in bottles.
9. Buy softdrinks, etc. in returnable bottles.
10. Do not depend on paper towels; use a sponge or towel.
11. Use linen napkins, not paper.
12. Use fewer electric appliances.
13. Use fewer motor-run appliances.
14. Use baking soda and a scouring pad instead of ajax, etc.
15. Reuse bags and boxes whenever possible.
16. Use detergents low in phosphates (40% of phosphates in water pollution comes from detergents.
17. Use less power in winter by keeping your house a few degrees cooler.
18. Do not burn leaves, incinerators or fires.
19. If you and every other person puts a brick in his toilet tank, 30,000 gallons of water will be saved daily.
20. Do not buy shampoos, lotions, etc. in plastic containers.
21. Do not smoke (there is 1/2 million tons of tobacco pollution annually).
22. Do not use dixie cups, paper plates, etc.
23. Do not use sun tan or body lotions when swimming in lakes, etc.
24. Write your Congressman or Senator demanding environmental action.
25. Do not be afraid to speak out. The future of our environment and our lives does not depend on the other guy. It depends on you!

SCIENCE EXERCISE PLANS

Incorporating Environmental Studies

JUNIOR HIGH SCHOOL LEVEL

Sources Consulted in Developing: -

Audubon Bird Study Program
National Audubon Society
1130 5th Avenue
New York, N. Y. 10028

Audubon Tree Study Program
National Audubon Society
1130 5th Avenue
New York, N. Y. 10028

Southeastern Pennsylvania Outdoor Education Materials Center
Sycamore Mills Road
Media, Pennsylvania 19063

Manual for the Outdoor Teacher
Tri-District Outdoor Education Center
Worthington, Ohio 43085

Teacher's Curriculum Guide to Conservation Education
Edited by Matthew J. Brennan
J. G. Ferguson Publishing Company

Compiled by:

Mrs. Jessie Myers
Science Teacher
Bourbon County Junior High School
Paris, Kentucky 40361

EXERCISE #1

Title of Lesson: Life in a Pond

Purpose:

To help students discover, through observation and investigation, factors which cause an imbalance in the pond community

Behavioral Objectives: At the conclusion of these activities, the students should be able to:

1) Identify "producers" and "consumers" in a pond
2) Identify imbalances caused by a) too many or too few organisms, b) too many or not enough scavengers, c) water is too hot or too cold, d) water has too much acid or alkaline, and e) too much sunlight or not enough sunlight

Materials Needed:

1) Aquarium
2) Plants and animals from ponds
3) Microscope
4) Hand lens
5) "Life in a Pond", film.

Activities:

1) Set up micro-pond in aquarium.
2) Study pond life in the outdoor laboratory.
3) Collect plankton samples to be examined for composition.
4) Observe microscopic plant and animal life in a pond.
5) Show film, "Life in a Pond".
6) Pages 4-12, Life Science.

Follow-up Activities:

Presentation of data collected by small groups.

Evaluation:

1) Be able to identify 8 kinds of animal life found in or near ponds.
2) List 5 causes of imbalance in pond communities.
3) Offer suggestions for the reestablishment of a pond community.

Reference Materials:

1) Life Science, Brandwein/Stollberg/Burnett
2) Fieldbook of Ponds and Streams, G. P. Putnam and Sons
3) Pond Life, Golden Nature Guides, Zim
4) "Life in a Pond", film

Title of Lesson: Birds

Purpose:

To teach the concept that birds are animals that have the same basic needs as other animals and that they show various adaptations to the environment in which they live

Behavioral Objectives: At the conclusion of these activities, the students should be able to:

1) Set quietly for 15 minutes making observations
2) To learn to recognize 10 birds
3) To be able to tell how birds' feathers, bills, feet and legs are adapted to their way of life
4) To be able to identify the external parts of a bird
5) Should be able to describe the internal adaptations of a bird has for flight

Materials Needed:

1) Bird pictures
2) Migration charts
3) Plastic model of bird skeleton
4) Bird feathers
5) Chicken bones
6) Records
7) Films

Activities:

1) Discuss a) how birds are a part of the general ecological pattern, b) the body structure of birds, c) bird colors, d) bills and feet, e) how they are harmful or helpful, f) enemies of birds, g) hunting birds (seasons for hunting), h) bird migrations, i) internal body structure (how adapted to way of life).
2) Collect pictures of birds.
3) Make maps showing the 4 main routes or "fly ways" that birds of North America use when migrating.
4) Make up bird riddles.
5) Make "winter pies" for birds.
6) Make bird feeders and/or bird houses.
7) Play bird records ("Bird Songs in Your Garden" for example).
8) Show films, "Cicada and Robin Redbreast"; "The Purple Martin Story"; "Mallards".
9) Observe birds (with binoculars).

Follow-up Activities:

1) Put out bird feeders and winter pies.
2) Put up bird houses.
3) Put out nesting material.

Evaluation:

1) Make and fill in an identification chart for 5 birds.

2) Draw a sketch of a bird and label all external parts.
3) Mark 4 major "fly ways" of birds on blank map.
4) Give oral or written report on a bird.

Reference Materials:

1) Audubon Bird Study Program
2) Field Guide to the Birds, Peterson, Roger Tory
3) Birds: A Guide to the Most Familiar American Birds, Golden Nature Press, Zim
4) Manual for the Outdoor Teacher, Tri-District Outdoor Education Center
5) Life Science, Brandwein/Stollberg/Burnett
6) "Cicada and Robin Redbreast"; "Mallards"; "The Purple Martin Story", films
7) Record, "Bird Songs in Your Garden"

Bird Riddles

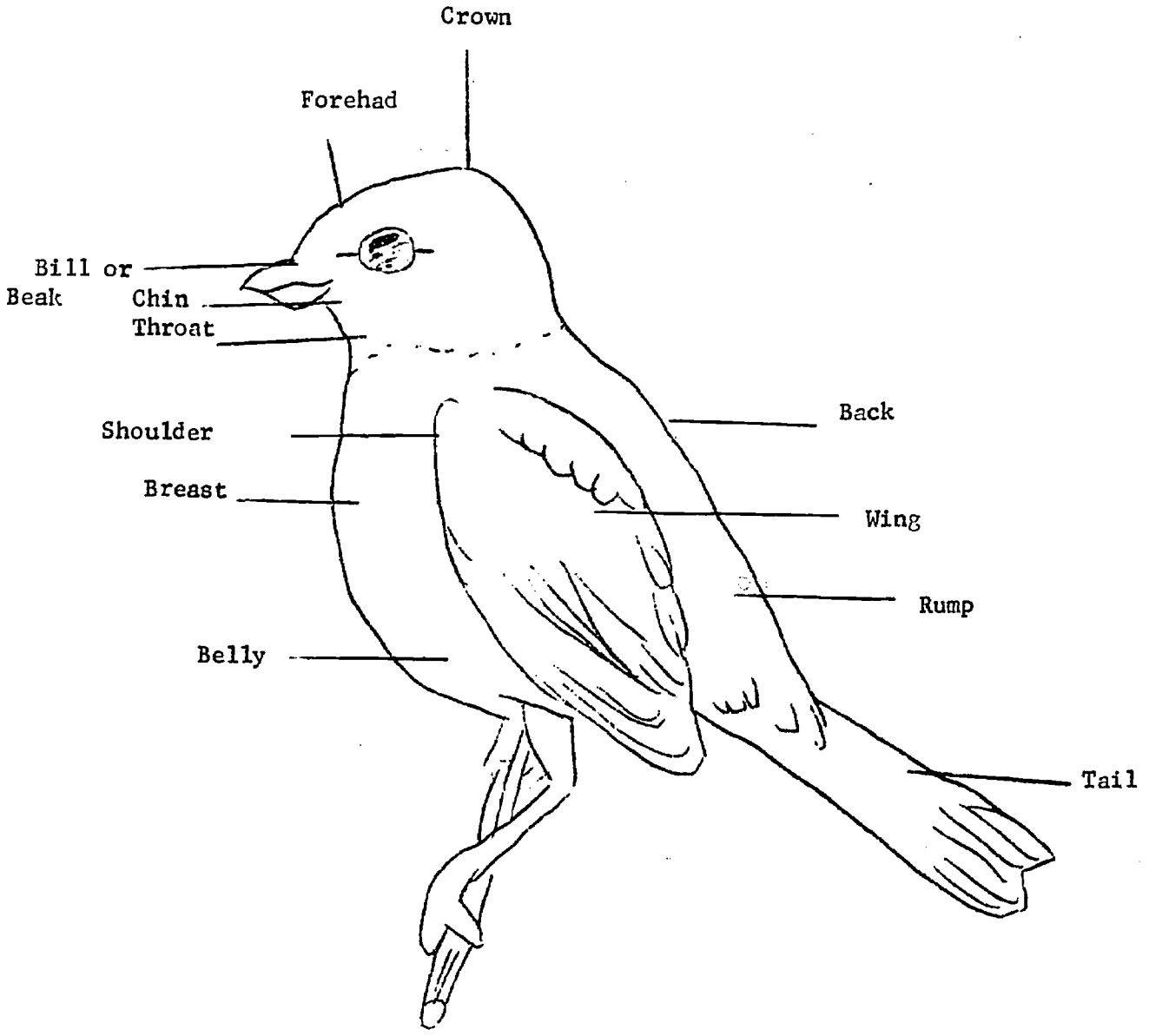
1) I am a letter of the alphabet _____.
2) I am a high official of a church _____.
3) I am very fast, especially near chimneys _____.
4) The man doing construction work uses me _____.
5) Although I am a symbol of happiness, people think of my color when they are sad _____.
6) You'll find me at a corner spelled differently _____.
7) I must be a good baker because my nest looks like part of the kitchen ____.
8) I like to have a gay time _____.
9) I am just a "little feller" _____.
10) You might need me on your baseball team ____.
11) I help get your food to your stomach _____.
12) I really don't chew my cud nor give milk _____.
13) I lost my hair _____.
14) They say I have fur _____ woodpecker.
15) I'm a thief; I was caught in the act of _____.

Answers:

1) Jay
2) Cardinal (Bishop)
3) Chimney Swift
4) Crane
5) Bluebird
6) Tern
7) Ovenbird
8) Lark
9) Creeper
10) Fly Catcher
11) Swallow
12) Cowbird
13) Bald Eagle
14) Downy
15) Robin

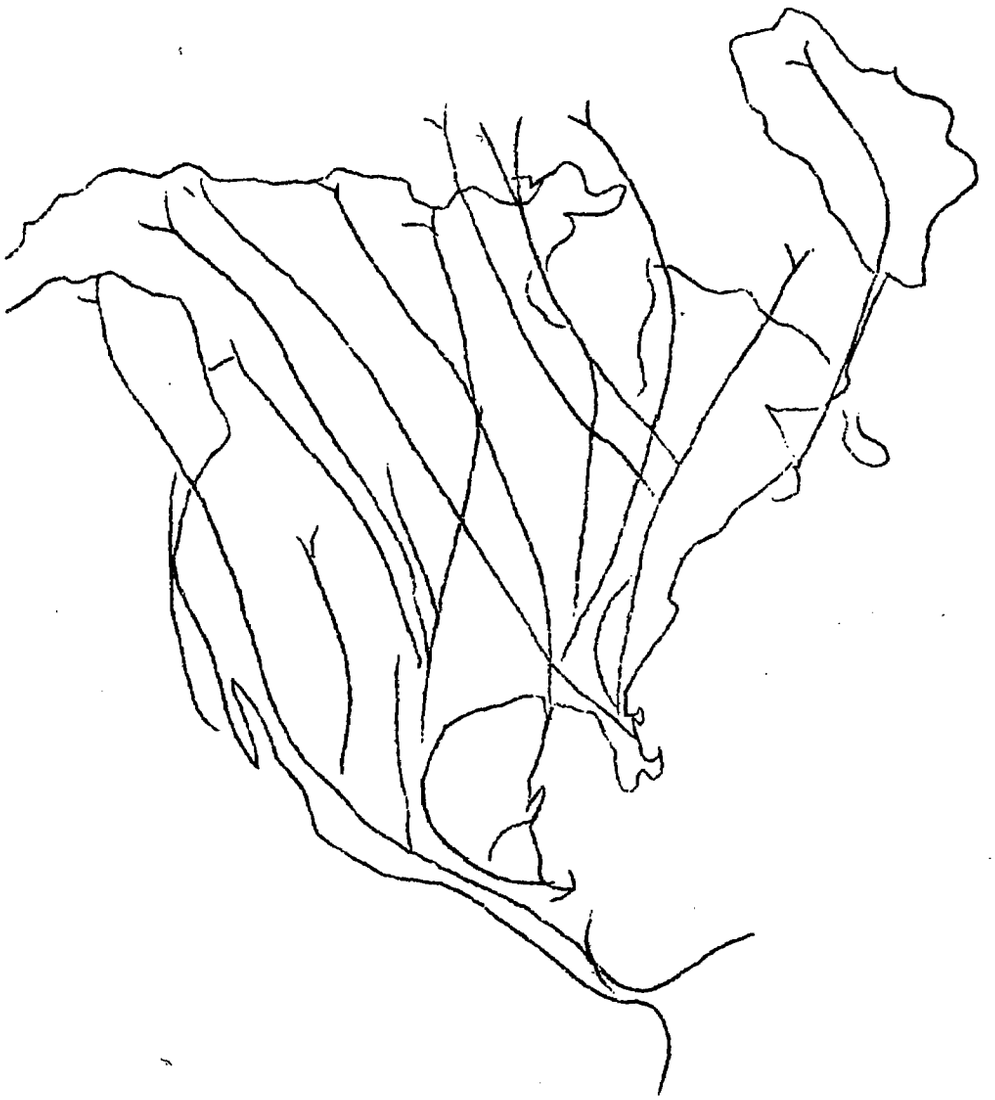
Parts of Bird

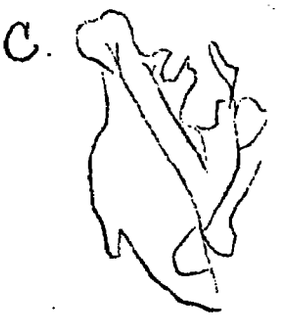
EXERCISE #2

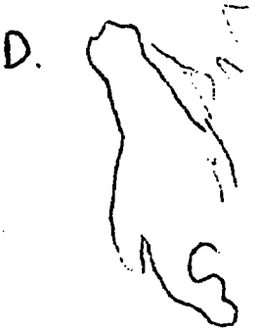


EXERCISE #2

Migration Routes

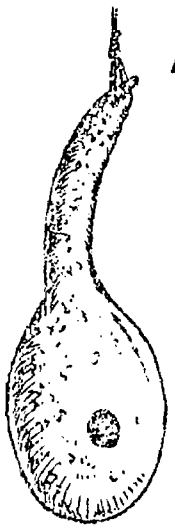




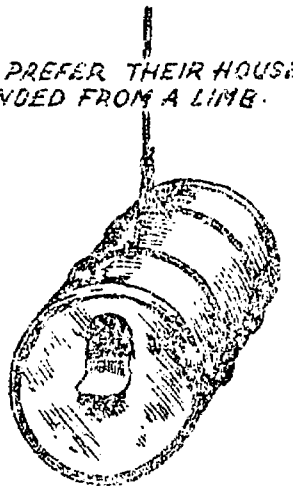


A. Pacific Flyway
B. Central Flyway
C. Mississippi Flyway
D. Atlantic Flyway

BIRD HOUSES

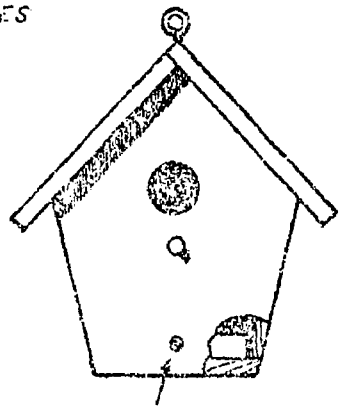


TWO OR THREE GOURD WREN HOUSES WILL OFTENTIMES ATTRACT WRENS SOONER THAN WOODEN HOUSES.

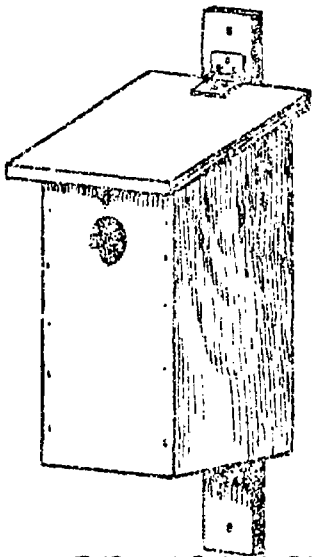


WRENS PREFER THEIR HOUSES SUSPENDED FROM A LIMB.

TIN CAN HOUSES SHOULD BE PLACED IN A SHADY LOCATION TO PREVENT OVERHEATING.

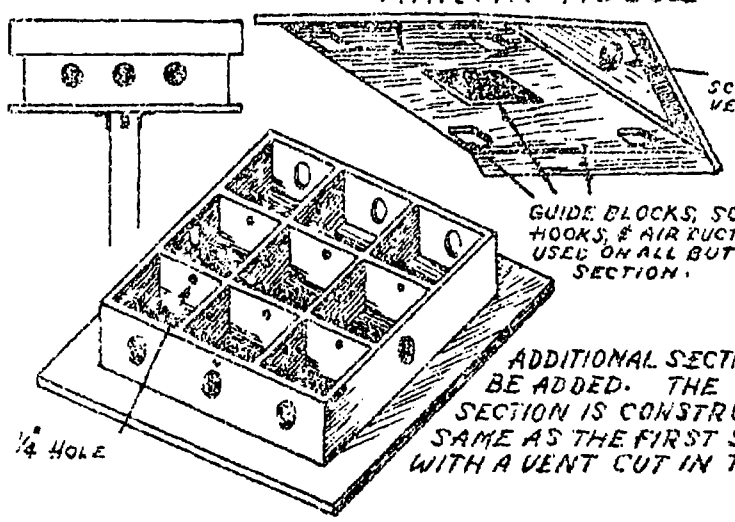


2 SCREWS SECURE THE FLOOR OF THIS HOUSE AND FACILITATE CLEANING.



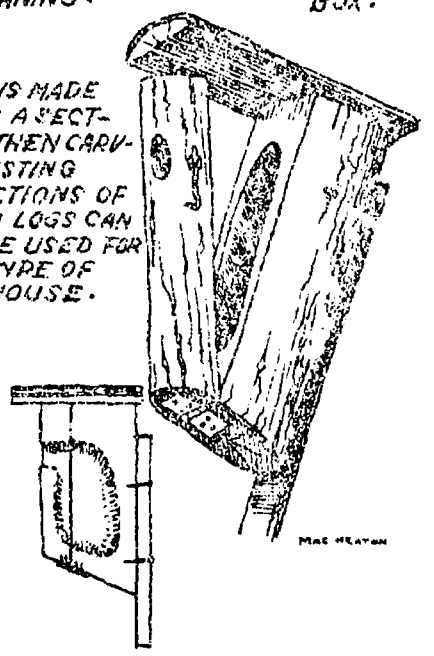
TYPICAL BLUEBIRD BOX.

MARTIN HOUSE



ADDITIONAL SECTIONS MAY BE ADDED. THE SECOND SECTION IS CONSTRUCTED SAME AS THE FIRST SECTION WITH A VENT CUT IN THE FLOOR.

THIS HOUSE IS MADE BY SPLITTING A SECTION OF LOG, THEN CARVING OUT A NESTING CAVITY. SECTIONS OF HOLLOW LOGS CAN ALSO BE USED FOR THIS TYPE OF BIRD HOUSE.



SPECIES	FLOOR OF CAVITY	DEPTH OF CAVITY	ENTRANCE ABOVE FLOOR	DIA. OF ENTRANCE
BLUE BIRD	5"X 5"	8"	6"	1½"
CHICKADEE	4"X 4"	8"–10"	6"–8"	1⅛"
TITMOUSE	4"X 4"	8"–10"	6"–8"	1¼"
NUTHATCHES	4"X 4"	8"–10"	6"–8"	1¼"
HOUSE WREN	4"X 4"	6"–8"	1"–6"	⅞"
CAROLINA WREN	4"X 4"	6"–8"	1"–6"	1⅛"
CRESTED FLYCATCHER	6"X 6"	8"–10"	6"–8"	2"
FLICKER	7"X 7"	16"–18"	14"–16"	2½"
RED-HEADED WOODPECKER	6"X 6"	12"–15"	8"–12	2"
DOWNY WOODPECKER	4"X 4"	8"–10"	6"–8"	1¼"
PURPLE MARTIN	6"X 6"	6"	1"	2½"
TREE SWALLOW	5"X 5"	6"	1"–5"	1½"
BARN OWL	10"X 18"	15"–18"	4"	6"
SPARROW HAWK	8"X 8"	12"–15"	9"–12"	3"

Distributed by:
The Indiana Department of Conservation, Division of Public Information
612 State Office Building, Indianapolis 9, Indiana

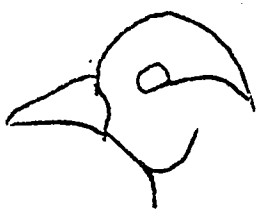
Measures and Sizes for Birdhouses

EXERCISE #2

	House Floor	House Depth	Size of Entrance	Entrance to Floor	House to Ground
ROBIN	7x7"	7 to 8"	open side	open side	6 to 15'
TREE SWALLOW	5x5"	6"	1½to2½"	3 to 5"	6 to 15'
FLICKER	7x7"	16 to 18"	2½"	14 to 16"	6 to 20'
CHICKADEE	4x4"	8 to 10"	1¼to2½"	6 to 8"	5 to 15'
NUTHATCH	4x4"	8 to 10"	1¼to2½"	6 to 8"	8 to 20'
MARTIN	6x6"	6"	2½"	1"	15 to 20'
HOUSE WREN	4x4"	6 to 8"	6"	1"	5 to 10'
BLUEBIRD	5x5"	8 to 10"	6"	1½"	4 to 10'
CRESTED FLYCATCHER	6x6"	8 to 10"	6"	2"	8 to 20'
SCREECH OWL	8x10"	12 to 15"	9 to 10"	3¼"	10 to 30'
RED-HEADED WOODPECKER	6x6"	14 to 16"	12 to 14"	2"	8 to 10'
TUFTED TITMOUSE	4x4"	8 to 10"	6 to 8"	1¼"	5 to 15'

EXERCISE #2

Bird Comparison

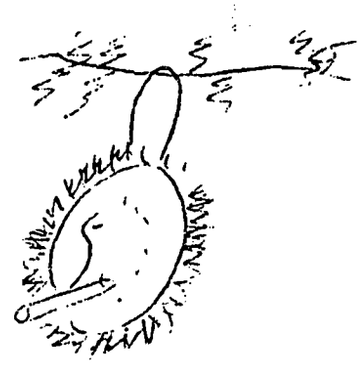
	MALLARD				
Draw a picture of the bird's foot					
Draw a picture of the bird's bill					
List the type of food that the bird usually eats	pond weeds some seeds aquatic in-sects				

	NAME				EXERCISE #2
NO	Tuft				
YES	Crest				
USE OF	Foot				
	Bill				
COLOR OF:	Tail				
	Rump				
	Back				
	Wing				
	Shoulder				
	Belly				
	Breast				
	Throat				
	Chin				
	Crown				
	Forehead				
SIZE	Crow				
	Robin				
	Sparrow				

EXERCISE #2

WINTER PIE

Cook 2 cups oatmeal in 4 cups water for 2 minutes. Add one lb. lard and one 12-oz. jar peanut butter. Remove from heat and add 3 1/2 cups each of oatmeal, corn meal and cream of wheat. Knead thoroughly and fill little frozen chicken pot pie containers with this mixture. Before this mixture hardens, rim the edge with evergreen twigs and insert a "perching stick". Store in your refrigerator or freezer and put these out, one at a time, as needed.



BIRD OUTLINES

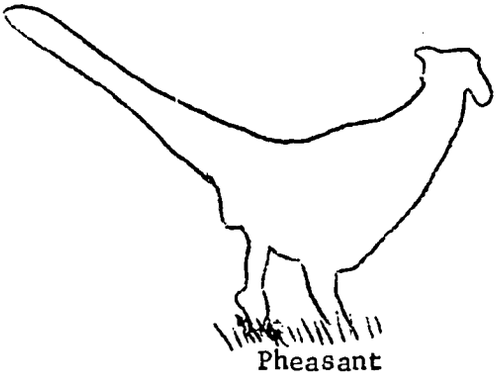
EXERCISE #2

Sparrow

Robin

Crow

Nuthatch



Pheasant

Wren

Barn Swallow

Mourning Dove

Mockingbird

Blue Jay

Quail

Cardinal

Belted Kingfisher

Woodpecker

Title of Lesson: Soil

Purpose:

To develop the concept that chemical and physical changes in the earth's crust change rock into soil

Behavioral Objectives: At the conclusion of these activities, the students should be able to:

1) Discuss how raw materials of soil components are changed in order to become soil
2) Discuss the various types of weathering
3) Recognize decay processes
4) Distinguish between proper and improper use of land
5) Tell the soil composition as to nitrogen, phosphorus and potassium content; whether it is acid or alkaline
6) Explain how all living things are dependent upon soil

Materials Needed:

1) Glass jars
2) Soil samples
3) Granite and granite-derived soil
4) Shale or slate samples
5) Limestone
6) Dilute hydrochloric acid
7) Pans
8) Moss or grass
9) Soil maps and soil reports
10) Film

Activities:

1) Discuss a) how weathering of rocks produce soil, b) kinds of weathering, c) oxidation of plants and animals.
2) Learn the 4 basic parts of soil: a) minerals, b) air, c) water, and d) organic material.
3) Investigate erosion in our community.
4) Discuss how erosion can be prevented by: a) strip cropping, b) cover crops, c) crop rotation, d) woodland planting, and e) gully control.
5) Identify products that come from soil or from natural resources that come from soil.
6) Use soil testing kits to test soil samples brought by students.
7) Find out kinds of crops the soil is best suited for: what other factors are necessary for growth of crops.
8) Make a miniature soil profile.
9) Demonstrate erosion of soil by water with 2 pans of soil: one bare and one covered with moss or grass.

Follow-up Activities:

Keep on the look-out for signs of soil erosion.

Evaluation:

1) Written student tests (objective or subjective).
2) Write a paragraph on what life would be like in your area if the soil was poor.

Reference Materials:

1) "Story of Soil", film, Motion Picture Library
2) "Soil Maps and Soil Reports", U. S. Department of Agriculture
3) Teacher's Curriculum Guide to Conservation Education, Grades 7-9
4) Man and His Environment, p. 15
5) Manual for the Outdoor Teacher
6) Life Science, Brandwein/Stollberg/Burnett
7) Earth is My Home
8) Sharing the Soil

EXERCISE #3

SOIL PROFILE

Humus

Topsoil (surface soil)

Soil (parent material)

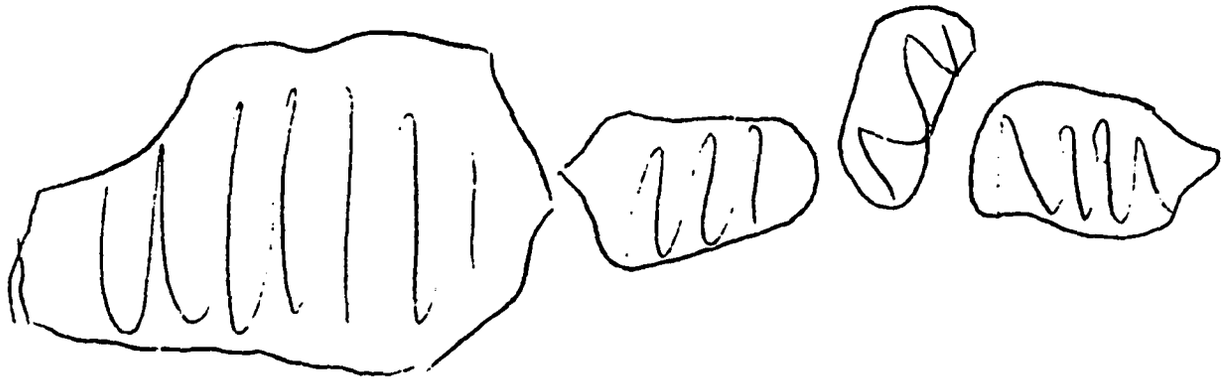
Bedrock (parent material)

...Miniature Soil Profile
Materials: large jar, spade, section of broom handle or similar object

(1) Where possible, locate a road out at the site of soil sample desired
(2) Make a vertical cut; usually one to three feet is adequate
(3) Note the various colors (layers) and the respective thickness of each

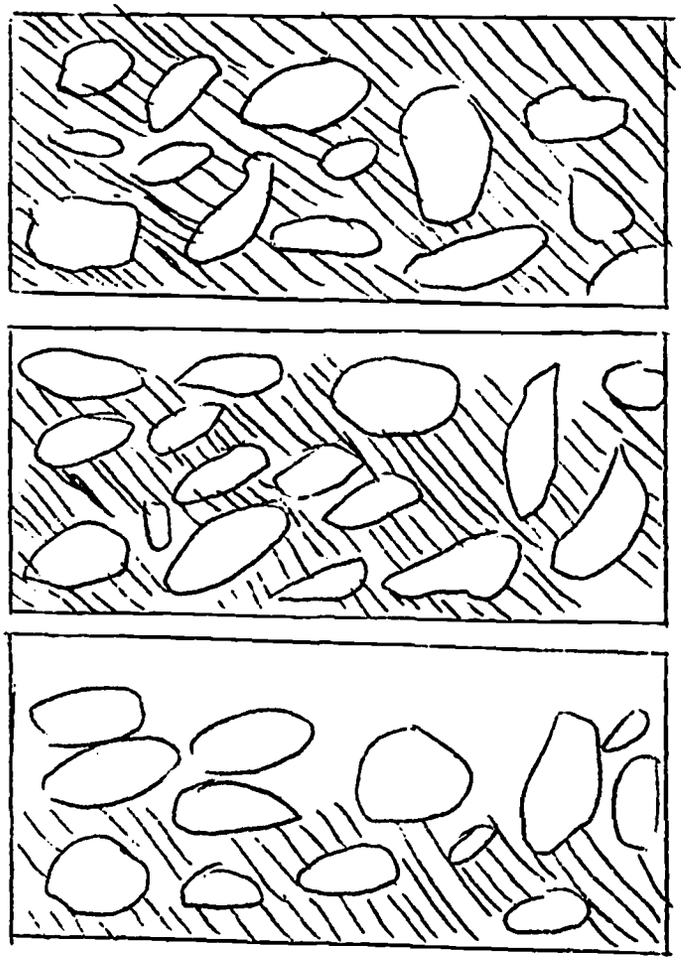
HYDRATION

EXERCISE #3



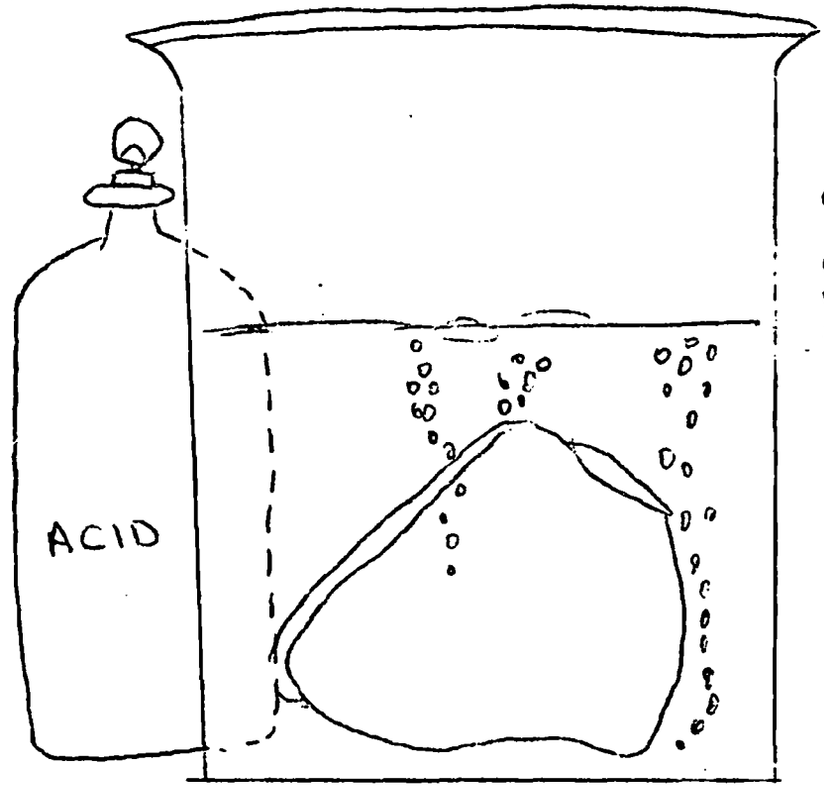
Water enters rock pores--elements in the water and the elements in the rock material combine chemically--this results in a kind of "swelling"--this "pressure" exerted from within the rock weakens it and, in time, it falls apart

SOLUTIONS



When water runs over rock material it weathers away the cementing material

Chemical Weathering

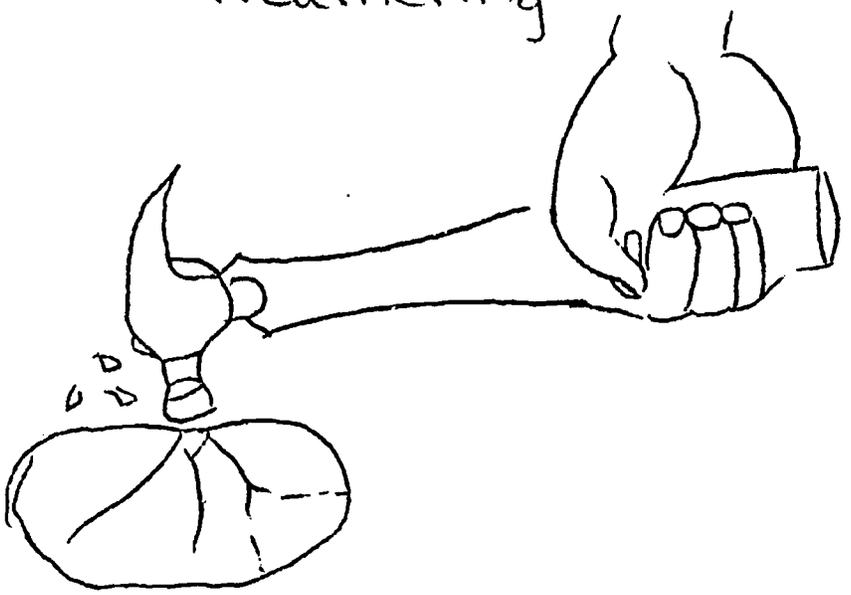


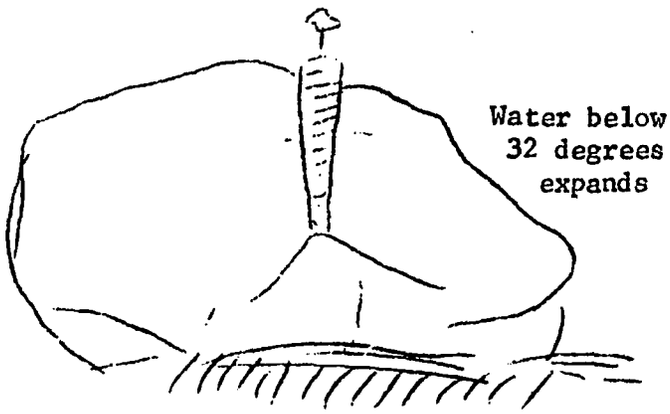
Carbonization---

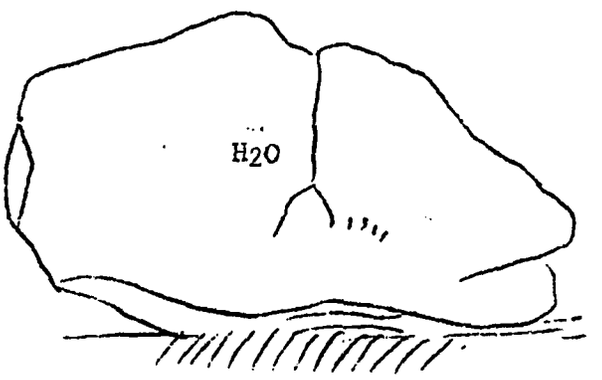
Carbonic acid is formed when rain water falls through the atmosphere

EXERCISE #3

Mechanical Weathering







EXERCISE #3

Organic Weathering

The root, in time, will break the rock into smaller pieces

Title of Lesson: Tree Identification and Uses

Purpose:

1) To give pupils an understanding of the forest
2) To develop an appreciation of how trees contribute to our lives
3) To develop a means of identifying trees

Behavioral Objectives: After completing these exercises, the students should be able to:

1) Use the senses of sight, touch and smell to discover several ways that trees differ
2) Identify and sketch 5 different tree shapes
3) Identify 15 different trees
4) Name observations helpful in identifying a tree
5) Tell 5 ways trees are valuable to us

Materials Needed:

1) Pictures of trees
2) Leaves
3) Aquarium
4) Charts
5) Electric Quiz Game
6) Films

Activities:

1) Take a field trip to the outdoor laboratory and other "nearby" wooded areas to study trees for identification.
2) Note the bark, leaves, shape and fruit of the trees.
3) Make a collection of fall leaves: identify and mount on cardboard.
4) Make a collection of tree seeds: identify.
5) Make a seedling herbarium.
6) Keep a diary of autumn Tree: a) color leaves turned, b) date first leaves fell, c) date last leaves fell.
7) Play "Electric Quiz Game", identify leaves.
8) Play game "Find the Trees" in the Forest.

Follow-up Activities:

1) Plant trees in spring.
2) Make comparison: leaves in spring and leaves in fall.

Evaluation:

1) Identify 15 trees from pictures or from outdoor laboratory.
2) Identify 5 trees from shapes.
3) Make a list of 5 ways trees are valuable to us.

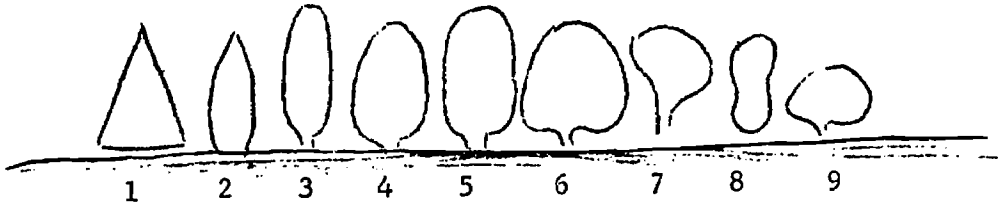
Reference Materials:

1) "Forest Series", film

2) "Forest Conservation", film
3) "Forest Produces", film
4) "Changing Forest", film, Consulate General of Canada
5) Audubon Tree Study Program, National Audubon Society
6) Forestry Project for 4-H Clubs, U. K. Extension Servi e
7) Identifying Trees (Circular 489), U. K. Extension Service
8) The Life of the Forest, St. Regis, 150 E. 42nd St., New York, New York, 10017
9) How a Tree Grows, U. S. Department of Agriculture
10) Trees of the Forest: Their Beauty and Use, U. S. Department of Agriculture
11) Forest Trees of Kentucky and How to Grow Them, Kentucky State Forest Service or U. S. Department of Agriculture
12) Yellow Poplar, Kentucky State Tree
13) Outdoor Laboratory, Southeastern Pennsylvania Education Center, 1130 Fifth Avenue, New York, New York, 10028

EXERCISE #4

TREE SHAPES



1--Spruce and Fir (triangle)
2--Cedar (ear of corn)
3--Lombardy Poplar (cucumber)
4--Sugar Maple (egg on end)
5--Red Maple (watermelon)
6--White Oak (haystack)
7--Elm (tack)
8--Hickory (peanut)
9--Apple (apple-upside down)

EXERCISE #4

CAN YOU FIND THE TREES?

M	A	S	H	I
U	P	B	D	L
O	L	E	A	B
M	H	C	R	I
W	E	Y	F	G

The word box is really a forest in which there are quite a few number of trees planted. See how many you can find. Start with any letter and try to spell out the full name of a tree. You can move in any direction--up, down, crosswise or diagonally, but without skipping a square. However, you may repeat the same letter more than once when necessary. For example, find "C" and spell "Cherry".

Title of Lesson: Flower Structures

Purpose:

To examine the structure of a flower and to determine the reproductive functions of its various parts

Behavioral Objectives: After the investigation, the students should be able to:

1) Identify the structures of a flower and tell the part each plays in its reproduction
2) Compare and contrast the same structures in different flowers

Materials Needed:

1) Flowers
2) Hand lens
3) Razor blade
4) Pictures
5) Chart showing structure of a flower

Activities:

1) Each student is to bring a flower from home. Examine outside of flower.
2) Dissect the flower to see the parts on the inside.
3) Collect pictures of flowers.

Follow-up Activities:

This unit may be followed by a unit on "flower classification and identification".

Evaluation:

Draw a diagram of flower structure: label 10 parts.

Reference Materials:

1) Life Science, Brandwein/Stollberg/Burnett
2) Audubon Plant Study Program, National Audubon Society
3) Southeastern Pennsylvania Outdoor Education Center
4) Manual for the Outdoor Teacher, Tri-District Outdoor Education 885 Evening St., Worthington, Ohio
5) "Flowers at Work", film
6) "Look at a Flower", film, Dowden, Anne; Thomas Y. Crowell Co.

SOCIAL STUDIES EXERCISE PLANS

Incorporating Environmental Studies

JUNIOR HIGH SCHOOL LEVEL

Sources Consulted in Developing:

This is America's Story
Houghton-Mifflin Company
666 Miami Circle, N. E.
Atlanta, Georgia

A World View
Silver Burdett Company
460 South Northwest Highway
Park Ridge, Illinois

The Kentucky Story
Harlow Publishing Corporation
Norman, Oklahoma

Compiled by:

Mrs. Laura Gray
Social Studies Teacher
Bourbon County Junior High School
Paris, Kentucky 40361

...UNIT SECTION ON PESTICIDES...

Sources Consulted in Developing:

"Food Chain"
Reprint from Virginia Wildlife, March, 1960

"Chemical Pesticides"
Instructor, April, 1970

Mist of Death
William Eblen, John Daller, Bert Schwartz
Pendulum Press, Inc.
West Haven, Connecticut

CONSERVATION PLEDGE

I give my pledge as an American
to save and
faithfully to defend from waste
the natural resources of my Country:
its soil and minerals,
its forests, waters and wildlife.

MAN-MAKING

We are all blind until we see
That in the human plan
Nothing is worth the making,
If it does not make the man.

Why build these cities glorious
If man unbuilded goes?
In vain we build the world,
Unless the builder also grows.

Edwin Markham

EXERCISE #1

Title of Lesson: Noise Pollution: A Problem in American Life

Purpose:

To define noise pollution and present ways of combatting it.

Behavioral Objectives: After completing this exercise, the students will be able to:

1) List 8 typical examples of sound and where the sound would be listed on the "decibel scale"
2) Define "noise"
3) Define "sound"
4) Describe forms of noise pollution in cities
5) List 5 examples of noise pollution in their own lives
6) List 4 ways of fighting noise pollution

Materials Needed:

1) Textbooks
2) Sketch of decibel scale
3) Puzzle
4) Poster
5) Magazines
6) Film

Activities:

1) Students will read textbooks.
2) Students will discuss the problems of cities.
3) Students will discuss the problems of noise in cities.
4) Students will define "sound". Sound is a wave, a mechanical motion of molecules (compare how waves of water move to the way waves of sound move).
5) Pass out sketch of decibel scale and discuss other examples that could fit into categories. Sample readings: a) house party, b) 4-piece rock band, 115db, c) screaming child, 92db, d) sportscar running in street, 86db, e) traffic at a residential intersection, 82db.
6) The students will discuss what noise is and how noise pollution affects their lives. Noise is unwanted sound; many times, it results because of action (examples: airports, construction, forms of recreation). Results of noise: a) noise can irritate and cause tension, b) loud noise can speed up breathing, raise blood pressure, make metabolic rate go up, cause sugar level to drop, increase level of cholesterol in blood, damage hair cells in the ear which can never be renewed and this results in hearing loss.
7) The students will discuss ways of combatting noise pollution: a) reduce loudness of noise by building quieter machines and engines, b) muffle the noise around you by earplugs or sound barriers, c) build products that do not produce loud noises (refusal of the SST).
8) The students will write letters to government officials (local, state or federal) asking that measures be taken to fight noise pollution.

9) Students will investigate their school, finding examples of noise pollution.
10) Students will develop means of combatting noise pollution in their school.
11) Students will present these examples and their suggestions for improvement to the principal, student council, or any form of governing body that will help the whole school become aware of the problems. They could publish a pamphlet or make posters for the school.
12) Students will make a list of noise pollution within their own lives: at home, school and play.
13) Put these lists on the board and compare how many are the same.
14) Each student will keep a log on noise pollution in his life for a week and report honestly in what ways he has tried to improve these conditions.

Follow-up Activities:

1) Work puzzle on sound.
2) The students will make posters showing different forms of noise pollution.
3) The students will discuss again how they can fight noise pollution in their lives.

Evaluation:

Test students on:
1) Definition of sound and definition of noise.
2) Definition, explanation and 8 examples of the decibel scale.
3) Describing types of noise pollution in cities and 5 examples of noise pollution in their lives.
4) 4 ways they can fight noise pollution.
5) They will also be graded on their letters written to government officials.
6) They will also be graded on their logs (how thoroughly they kept them and their posters).
7) They will also evaluate any changes or improvements about noise pollution in their school in a paragraph.

Reference Materials:

1) This is America's Story, Unit 8, Chap. 25
2) The Kentucky Story, Unit 8, Chap. 30
3) "The Curious Naturalist", Dec., 1970; Jan., 1971, vol. X, no. 4, Bourbon County Schools Materials Center
4) Paper on "Noise Pollution", Bourbon County Schools Materials Center
5) Newspaper articles on "Noise Pollution", Bourbon County Schools Materials Center
6) Free film to order, "To Conserve and Protect", Modern Talking Pictures

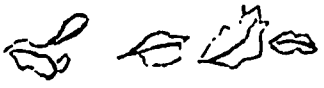
EXERCISE #1

DECIBEL SCALE

A DECIBEL IS A UNIT FOR MEASURING THE LOUDNESS OF A SOUND. ZERO IS THE SLIGHEST SOUND THAT CAN BE HEARD.

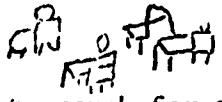
THRESHOLD OF AUDIBILITY

breathing



rustling leaves 0

FAINT a whisper at 5 ft.



quiet enough for a classroom 20

MODERATE

average living room

suburban playground 40

LOUD

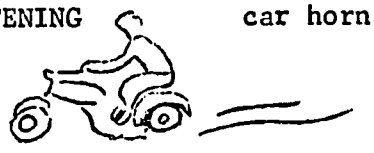
vacuum cleaner

city playground 60

VERY LOUD continued exposure brings about loss of hearing

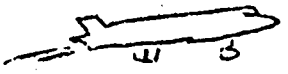
have to shout to be heard 80

DEAFENING car horn at 3 ft.



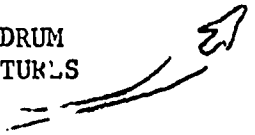
loud motorcycle or power lawn mower 100

PAINFUL TO HEAR siren



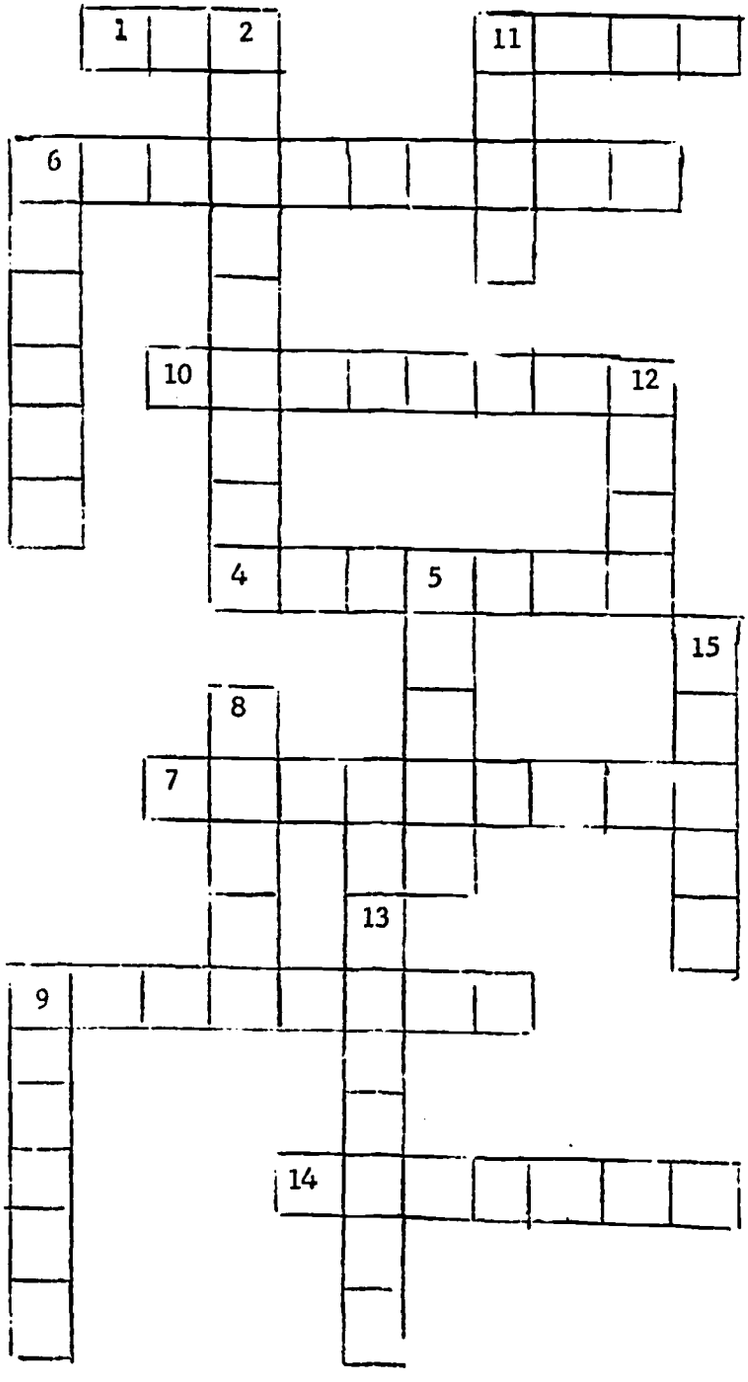
jet raising its motor before take-off 220

EARDRUM RUPTURES



jet taking off 240

EXERCISE #1



ACROSS:

1) Passenger airplane that flies faster than sound

4) Mammal that lives in the water and communicates by squeals

6) Human adults can hear from 20 to 20,000 ____ per second

7) Sound is the motion of _____

9) 40 on the decibel scale

10) Noise can cause ___ damage

11) Sound a dog makes

14) Noise is a by-___ of action

DOWN:

2) ___ of audibility

5) Tone level of sound

6) Sound is not made in a ___

8) Unwanted sound

9) Wearing ear plugs will ___ sound

11) Noise made by fast-moving jets

12) 100 on the decibel scale is a ___ mower

13) 140 on the decibel scale can rupture your ___

15) Man has refined sound into ___

ANSWERS. ACROSS: 1) SST, 4) Dolphin, 6) Vibrations, 7) Molecules, 9) Moderate, 10) Physical, 11) Bark, 14) Product

DOWN: 2) Threshold, 5) Pitch, 6) Vacuum, 8) Noise, 9) Muffle, 11) Boom 12) Lawn, 13) Eardrum, 15) Music

EXERCISE #2

Title of Lesson: Growth and Changes in Agriculture of America

Purpose:

To show how agriculture has changed and how these changes have affected the lives of Americans

Behavioral Objectives: After completing this exercise, the students will be able to:

1) Explain early forms of agricultural methods and problems
2) Identify several important men in agriculture
3) List 3 farm organizations
4) Explain 4 government agencies and programs
5) Explain 4 problems and methods of agriculture

Materials Needed:

1) Films
2) Filmstrips
3) Slides
4) Posterboard
5) Textbooks
6) Old magazines to be cut up

Activities:

1) Students read chapters in texts.
2) Students discuss early forms of agriculture.
3) Students do reports on famous men in agriculture and what they have attributed (examples: a) Edmund Ruffin, b) Eli Whitney, c) George W. Carver, d) Isaac Newton, e) Cyrus H. McCormick, f) Luther Burbank). Let them use other important people if they wish and have them work on their own.
4) Take class to library for research on agricultural organizations. Work in groups and then act out in class what are the functions of the various organizations. Use groups such as a) 4-H Club, b) FFA, c) Boy Scouts of America, d) National Grange.
5) Discuss problems and methods in agriculture: Problems--a) soil erosion, b) wind erosion, c) pollution of soil, d) floods and droughts, e) pesticides. Methods--a) contour plowing, b) irrigation, c) drainage, d) crop rotation, e) soil testing, f) keeping wildlife in balance, g) dams.
6) Have field representative of the Division of Soil and Water Conservation speak to the class.
7) Visit the outdoor lab or a local farm and see different forms of farming practice.
8) Class will discuss the major federal programs that help farmers (examples: a) Department of Agriculture, b) National Wildlife Federation, c) National Conservation Commission, d) Food and Agriculture Organization, e) Bureau of Land Management, f) Soil Conservation Service).

Follow-up Activities:

1) Students will make posters relating to any phase of this unit.
2) Students will discuss how farm life is different from earlier times.

Evaluation:

1) The students will describe early agriculture in a paragraph.
2) In a matching test, students will match men in agriculture with their achievements.
3) Students will list 3 farm organizations and 4 government agencies and explain their work.
4) Students will explain problems and methods in agriculture.
5) Students will list ways in which new farming methods have changed their lives.

Reference Materials:

1) A World View, Chaps. 7-10
2) Geography of Kentucky, Chap. 9
3) The Kentucky Story, Unit 3, Chap. 10; Unit 5, Chap. 15; Unit 7, Chap. 23
4) This is America's Story, Unit 7, Chap. 23; Unit 5, Chap. 15; Unit 2, Chap. 5
5) The World Book Encyclopedia, vol. 1
6) Soil Conservation by Kohnke and Bertrand, booklet
7) Soil and Water Conservation in Kentucky, booklet
8) Early American Conservationists, booklet
9) Soil and Water Conservation, booklet
10) The Case Against Hard Pesticides, booklet
11) Pollution by Pesticides, booklet
12) "The New Look in Agriculture", cassette tape
13) "Land Conservation Today", filmstrip
14) "Soil Conservation", slide
15) "The Colonial Naturalist", free film to order, Modern Talking Pictures
16) "We Share This Land", free film to order, Motion Picture Library
17) "Yours is the Land", free film to order, Motion Picture Library

Booklets are found in the Bourbon County Schools Materials Center

EXERCISE #3

Title of Lesson: The Importance of Forests to Early America and Modern America

Purpose:

To show how forests were important to early Americans and to show how they are important to America today

Behavioral Objectives: After completing this exercise, the students will be able to:

1) List and identify the 2 great classes of trees
2) Describe logging and how the log is used
3) List why forests are important to America today

Materials Needed:

1) Textbooks
2) Examples of conifers and broadleafs
3) Films
4) Slides

Activities:

1) Before beginning chapter in text, have students list what products they can think of that are made from trees and then have them share their lists with each other.
2) Use outdoor lab to identify the 2 great classes of trees.
3) Read the textbook.
4) Divide the class: have one group deal with uses of timber for pioneers, have the other group deal with uses of timber to today (oral reports, discussions, written reports, posters, etc.).
5) The students will discuss methods of logging in class (use chart of log).
6) Class discussion of why forests are important today (rich soil, wildlife, man's uses, balance of nature).

Follow-up Activities:

1) Students give voluntary reports on their own experiences with forests (for extra credit).
2) Describe a visit to a sawmill.
3) Describe forests belonging to individual students and what conservation practices their parents might take.
4) Notebook on types of trees.
5) Bring in self-made products from trees.

Evaluation:

1) Test students on pioneer uses of lumber and forests.
2) Test students on modern uses of lumber and forests.
3) Test students on 2 types of trees .
4) Test students on logging.
5) Test students on importance of forests today.

Reference Materials:

1) A World View, Chap. 11
2) The Kentucky Story, Unit 2, Chap. 5
3) Geography of Kentucky, Chap. 11
4) This is America's Story, Unit 2, Chap. 5
5) "Forest Resources", J. Weston Walch, slides

6) "Forests and Trees of the United States", chart
7) "Products from Trees", chart
8) "The Life of the Forest", chart
9) Audubon Tree Study Program

Above materials from Bourbon County Schools Materials Center

10) "From Trees to Lumber", L. Raymer Jones, film
11) "Living Forest Series", L. Raymer Jones, film
12) "The Endless Forest", Modern Talking Pictures, film

The above films can be ordered free

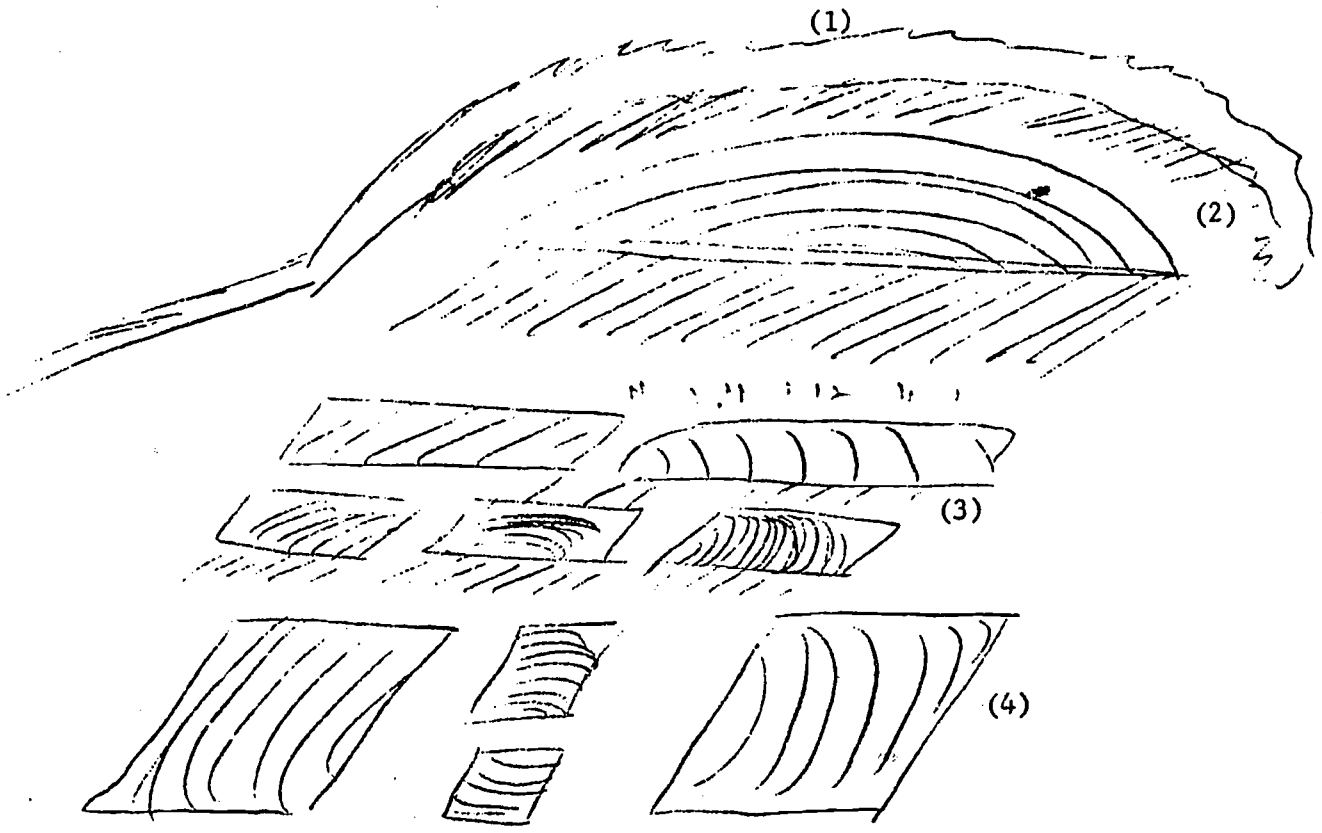
13) Forest Land: Everybody's Concern, booklet
14) Forestry, booklet
15) Forestry in Kentucky, booklet

The above booklets available from Bourbon County Schools Materials Center

EXERCISE #3

USES OF LUMBER

Cross Section of a Log

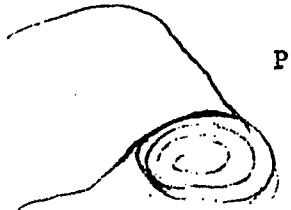


Debarking the log--bark is not used for paper, but it can be used for fuel and soil mulch. Bark does not go into the chipper.

Rounded sides of the log--are called slabs. These are first to go into the chipper.

The outer portions of the log--hare the fewest knots. This "clear" is made into planks or boards of different thickness of 1-3 inches.

Center logs--have more knots and are cut into bigger sections. These logs are used for structural beams. The more knots a log has, the weaker the log is.



Plywood is made by "peeling". This is done by holding a long blade against a rotating log.

EXERCISE #4

Title of Lesson: Natural and Mineral Resources and the Growth of America

Purpose:

To show how important natural and mineral resources are to the growth of America and that man has to take the responsibility to use these resources in a way that they can be renewed

Behavioral Objectives: After completing this exercise, the students will be able to:

1) List ways in which natural and mineral resources have helped America grow agriculturally and industrially
2) Explain why trade is essential to the United States in regard to natural resources
3) Describe how natural and mineral resources have been and are necessary to the military development and security of our country
4) List ways in which man can preserve and restore natural and mineral resources

Materials Needed:

1) Textbooks
2) Charts
3) Foods from other countries
4) Paper money
5) Colored cards

Activities:

1) Students will read assigned chapters.
2) Students will discuss how rich land of America was essential to its growth: a) its ability to support life to the first hunters, b) its ability to produce life for the farmers, c) its ability to provide minerals to the craftsmen.
3) Students will discuss how our natural resources enabled more and more people to come to America and find occupations: a) farming, b) mining, c) developing industries.
4) Students will choose one industry and report as many natural and mineral resources as they can that are needed to support that industry (examples: a) steel, b) lumber, c) tobacco, d) plastic, e) coca-cola).
5) Students will do reports showing what natural resources must be brought to the United States and what resources are shipped out of the United States. Charts will be drawn to show their findings. Discussions will then take place as to why trade is essential to the growth of America.
6) After charts are made, set up a game showing how one country might bargain with another for natural resources. (2 students will represent a country and will be given money (paper) according to the wealth of that country, and colored cards representing how much of each mineral resource they own. The students will have to play so they deplete themselves in neither money nor natural resources.) Statistics are attached to determine the number of cards the students will receive.

7) Without using books, students will list what natural and mineral resources they can think of that are used in time of war. Put as many as possible on the board. Then discuss why they felt natural resources helped the victors in wars (examples: a) Civil War, b) World War I, c) World War II).
8) Students will then break into groups and take one natural or mineral resource and prepare reports on how this resource can be renewed or used wisely (examples: a) forests, b) petroleum, c) soil, d) wildlife, e) water, f) air, g) iron ore). These reports will be given orally.

Follow-up Activities:

Each student bring a food product whose main ingredients do not come from the United States and this can be eaten in class.

Evaluation:

1) The students will be evaluated on their charts and their oral reports.
2) The students will write a paper explaining: how natural and mineral resources helped agriculture, industry, trade and victory for America, and how man can use his natural and mineral resources wisely and how he can renew some of them.

Reference Materials:

1) The Glory Trail, Swift, Ernest
2) "Our Air", Modern Talking Pictures, free movie to order
3) "The Meaning of Conservation", L. Raymer Jones
4) "Minerals and Medals", Bourbon County Schools Materials Center, filmstrip
5) "Mineral Conservation Today", Bourbon County Schools Materials Center, filmstrip
6) "The World Makes an Automobile", Bourbon County Schools Materials Center, chart

COUNTRY	LEADING COUNTRIES IN GROSS NATIONAL PRODUCT (BILLION DOLLARS)	VITAL NATURAL AND MINERAL RESOURCES (MOST COMMON)
United States	900	petroleum, bauxite, building stone, copper, lead, phosphorus, zinc, potash, uranium
Russia	400	forests, wildlife, tin (only real need), coal, natural gas, petroleum, iron ore, manganese, chromium, nickel, lead, zinc, copper

Japan	200	lead, coal, copper, zinc
West Germany	200	lead, zinc, forests, potash, iron ore, coal, uranium
France	200	bauxite, coal, gypsum, iron ore, potash, uranium
Great Britain	100	coal, iron ore, chalk, clay, limestone, salt, sand, gravel
China	85	forests, coal, iron, manganese, salt, tin, tungsten
Italy	75	asbestos, bauxite, marble, mercury, sulfur, zinc
Canada	66	copper, gold, iron, lead, nickel, silver, zinc, petroleum, uranium, coal, forests
India	44	magnesite, salt, copper, lead, sulfur, coal, iron ore, chromite, gypsum, limestone
Poland	39	coal, lead, zinc, iron ore, sulfur rock, salt, potassium
East Germany	32	iron ore, forests, coal
Australia	29	lead, copper, gold, silver, zinc, iron ore, petroleum, coal
Brazil	29	iron ore, manganese, gold, diamond

Czechoslovakia	27	copper, iron ore, limestone, petroleum, coal, clay, manganese
Mexico	26	coal, copper, fluorspar, iron ore, tin, zinc, lead, natural gas, petroleum, manganese
Sweden	26	copper, gold, iron ore, lead, uranium, zinc
Netherlands	25	natural gas, salt, petroleum
Spain	25	sulfur, iron ore, salt, coal, copper, mercury
Belgium	20	coal, copper, lead, zinc

EXERCISE #5

Title of Lesson: Christmas for the Birds

Purpose:

To help students to learn and practice conservation and also to learn more about winter birds of their area

Behavioral Objectives: After completing this exercise, the students will be able to:

1) Identify 4 winter birds of the area
2) List 2 ways they can practice wildlife conservation

Materials Needed:

1) A tree or trees in the outdoor lab
2) Stale bread
3) Popcorn and popper
4) Cranberries
5) String and needles
6) Peanut butter
7) Birdseed
8) Bird identification book
9) Binoculars
10) Chart

Activities:

1) The students will go to the library to find books on birds and determine which birds would be found in our area in the winter. Books from home can also be used.
2) The students will prepare food for the tree(s).
3) The students will then observe the birds and make notes (examples: a) manner of flying such as soaring, flapping, darting, b) special tail action such as wagging, darting from perch, hopping, tree climbing, c) feeding such as foods preferred, methods of eating, d) communication such as calls, songs, pecking, e) interrelations with other birds such as same species or different species, f) on chart, place where birds were spotted.
   Before doing Activity 3, go to outdoor lab and decorate tree(s).
4) The students will come back to class and describe in a paragraph to be read aloud, what they have seen.
5) The students will discuss ways in which they can feed and preserve birds at home and how they can follow up this project after the holidays.

Follow-up Activities:

1) Students can report on different birds or the same birds they have seen at home.
2) Students can tell of things they have done at home to conserve birds.

Evaluation:

On a test:
1) The students will list 4 winter birds of the area and tell 2 things that distinguish one bird from another.
2) The students will give 2 ways in which they can conserve birds themselves.

Reference Materials:

1) A Field Guide to the Birds, Peterson, Roger Tory, Houghton-Mifflin Co.
2) Birds: A Guide to the Most Familiar American Birds, Zim and Gabrielson, Golden Press, can be obtained from Bourbon County Schools Materials Center
3) Audubon Bird Study Program, kit, Bourbon County Schools Materials Center
4) Environmentl Education: Objectives and Field Activities, Paducah Public Schools, Paducah, Kentucky
5) People and Their Environment, Bourbon County Schools Materials Center
6) Teacher's Curriculum Guide to Conservation Education, Bourbon County Schools Materials Center

Chart for Observing Birds

EXERCISE #5

Where Birds were Spotted

DATE:

Overhead

Topstory

Overstory

Understory

Shrub

Herbaceous

Floor

(Make copy for student)

EXERCISE #6

Title of Lesson: Pesticides: Why or Why Not?

Behavioral Objectives: The students will be able to:

1) Define: pesticide, soft pesticides, hard pesticides, food chain, biological control
2) Explain why pesticides are used
3) List 3 alternatives to pesticides
4) Discuss the dilemma of man when he chooses to use pesticides in terms of the food chain

Materials Needed:

1) Notebook in which to list the 5 words with definitions (in Behavioral Objective number 1) and any other words related to pesticides
2) Newspaper and magazine articles and pictures related to pesticides which can be put in the notebook
3) A chart or graph showing the food chain
4) Posters showing different labels and containers of pesticides

Activities:

1) List the 5 vocabulary words above on the board and have students define.
2) Have students discuss what they think pesticides are and then as a class, develop a definition of pesticide (example: a general term for any material--usually a chemical--to kill pests. This includes insecticides--to kill insects--herbicides--to kill weeds and fungicides to kill fungi).
3) Have students discuss from general knowledge why they feel pesticides came about and how they are helpful. Then discuss how they can be harmful.
4) Have each student draw a sketch of the food chain.
5) Students can have a debate and discuss why pesticides are harmful and helpful. They must understand the food chain thoroughly before this can be done intelligently.

"Pros" for debate: a) pesticides kill insects that carry dangerous diseases, b) crops yield more when pesticides are used, c) as population grows and land area decreases, this high yield is necessary, d) pesticides can make our environment more attractive by killing unsightly weeds.

"Cons" for debate: a) pesticides kill more than the pests they were intended for, b) because of the food chain, many people and wildlife are affected by pesticides, c) tiny soil and ocean organisms are affected by pesticides and this destroys productive soil and creation of oxygen.

6) The students will discuss which pesticide they think would be better to use and why: a) hard pesticides (those that take many years to break down and can easily travel by clinging to soil or moving in water), b) soft pesticides (can break down more quickly and become harmless but are more expensive and have to be used more often).
7) The students will determine through their own experiences and reading, other ways to control pests besides pesticides: a) biological

control methods: 1) cats kill rats, 2) praying mantises and ladybugs, 3) man bringing in natural predators and this can sometimes backfire (example: rabbits in Australia), 4) sterilizing male insects, b) killing on the spot: 1) flyswatters, 2) mousetraps, c) developing pest-resistant crops, d) destroy breeding places: 1) swamps, 2) unsanitary conditions.

Follow-up Activities:

1) Have students make posters showing the types of pesticides.
2) Compile the notebook so it is organized and can be added to.
3) Make a bulletin board showing the food chain.
4) Have students role-play the difficult situations that the question of pesticides raises: farmer, housewife, bald eagle, salesman for a pesticide firm, gardener, resort owner, phytoplankton.

Evaluation:

1) The students will give the definitions of the following: a) pesticide, b) soft pesticides, c) hard pesticides, d) food chain, e) biological control.
2) In an essay, the students will give 2 ways pesticides are helpful to man and 2 ways pesticides are harmful to man. They will also explain how pesticides affect the food chain.
3) The students will then draw a rough sketch of the food chain.
4) The studetns will list 3 alternatives to pesticides.

Reference Materials:

1) "Food Chain", reprinted from Virginia Wildlife, March, 1960
2) "Chemical Pesticides", Instructor, April, 1970, pp. 120-124
3) Mist of Death, Olen, William; Daller, John; Schwartz, Bert; Pendulum Press, Inc., West Haven, Connecticut

SOCIAL STUDIES EXERCISE PLANS

Incorporating Environmental Studies

JUNIOR HIGH SCHOOL LEVEL

Sources Consulted in Developing:

Conservation of Natural Resources
Edited by Guy-Harold Smith
John Wiley and Sons, Inc., New York, 1965

Environmental Education Objectives and Field Activities
Major, James M. et. al.
Paducah Public Schools
Paducah, Kentucky

Teacher's Curriculum Guide to Conservation Education
Edited by Matthew J. Brennan
J. G. Ferguson Publishing Co., Chicago, 1969

Compiled by:

Mrs. Allie Hibbs
Social Studies Teacher
Bourbon County Junior High School
Paris, Kentucky 40361

EXERCISE #1

SOILS AND SOIL CONSERVATION

Title of Lesson: Residual and Transported Soils

Purpose:

To gain a general idea of the transport of soils

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Identify residual and transported soils
2) Determine the best quality of the two
3) Know the main soil-rich areas of the United States

Materials Needed:

1) "Erosion: Leveling of the Land", movie, #5152, 15 min., color, $4.50 from Audio Visual Services, Bureau of School Services, College of Education, University of Kentucky, Lexington, Kentucky
2) Sample of rich delta soil
3) Sample of heavy-grain soil
4) Class set of stenciled maps of the United States showing river systems
5) Over-head projector
6) United States map transparency (outline showing river systems)

Activities:

1) Show movie.
2) Pass around grainy soil for each student to feel its texture.
3) Do same for delta soil.
4) Send student to board to take dictation from class.
5) Ask class for ideas on which soil was transported from another area and which probably moved little.
6) Ask class for reasons why.
7) Ask class for possible reasons and ways that soil could be transported.
8) Pass out maps.
9) Let students mark with "X's" the areas they think would have aluvial soils.
10) When finished, flash on over-head of map.
11) Pick volunteers to come to over-head to mark X's.
12) Have class vote on each X as it is put on by students.

Evaluation:

1) Soil samples above marked "A" and "B".
2) Blank maps as above.

Method:

1) Students identify soils on back of map.
2) Students mark with X's 3 main areas of transported soils.

Title of Lesson: Main Types of United States Soil and the Location of Each

Purpose:

For students to understand that there are different types of soil and that vegetation differs with each

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Identify 5 soils
2) Identify main areas of each soil on a United States map

Materials Needed:

1) Profile of each type of soil
2) Class set of stenciled maps of the United States
3) Over-head projector
4) Transparency of United States outline
5) Plain white paper for students
6) "Understanding Our Earth's Soil", #5092, 11 min., color, $4.00, University of Kentucky
7) Colored pencils for students
8) Colored markers for over-head

Activities:

1) Show movie.
2) Set profile up on tables in front of room.
3) Have studnets file by and look closely at profiles.
4) Appoint a student to put ideas on board; have him make wide columns on board.
5) Let students decide on names for each type of soil; they should call each by a color name (examples: red, yellow).
6) Group students into 5 groups (let each choose its own spokesman and secretary).
7) Have each group decide on characteristics of its soil and what they think would grow well in the soil.
8) One at a time have each spokesman tell about his group's soil while the secretary writes the main characteristics on the board.
9) Have class copy.
10) Pass out paper and colored pencils.
11) Pass around the profiles from group to group allowing time for students to draw each profile (be sure to have the students include the proper vegetation in their profiles).
12) Pass out maps and pencils.
13) On over-head, mark and identify (while students watch) the main soil areas of the United States with colored markers (remember to use student names for types).
14) Have students copy onto their maps.
15) All of these (maps, profiles, notes) could be arranged into a small booklet.

Evaluation:

1) Soil samples.

2) Outline United States map transparency with soil groups marked with numbers 6-10 (use over-head).

Method:

1) Number samples 1-5.
2) Hold up each sample separately.
3) From over-head, have students identify soil groups.

EXERCISE #3

Title of Lesson: Soil Erosion

Purpose:

To give students an idea of the types of soil erosion

Behavioral Objectives: After completing this exercise, the students should be able to:

Identify the following types of soil erosion:

1) Sheet
2) Gully
3) Wind
4) Animals (trampling and over-grazing)
5) Floods
6) Streams
7) Irrigation

Materials Needed:

1) "Story of Soil", movie, #C-5078, 11 min., $2.00, University of Kentucky
2) Cardboard shoe boxes
3) Dirt
4) Cups of water

Activities:

1) Show movie asking students to look for as many types of soil erosion as they can.
2) List types on board.
3) Show movie again.
4) Divide class into 7 groups.
5) Assign a different type of erosion to each group.
6) Each group is to use the boxes filled with dirt to illustrate its type of erosion. As few as one box per group or each student may have his own (for certain types of erosion, it may be necessary to plant grass or several types of grasses).
7) Some students may wish to draw their types of erosion.
8) When completed, each group will choose a spokesman who will use his group's models to explain to the whole class the particular type of erosion.

Evaluation:

Best models made by students.

Methods:

1) Number boxes.
2) Students identify the types by number on their papers.

EXERCISE #4

Title of Lesson: Soil Conservation

Purpose:

To show different methods of soil conservation

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Identify contour plowing
2) Identify terracing
3) Identify strip cropping and wind cropping
4) Identify crop variation
5) Identify fertilization
6) Identify limited grazing
7) Identify stream control

Materials Needed:

1) Cardboard
2) Dirt
3) Cups of water
4) "Land Conservation Today", filmstrip, Bourbon County Schools Materials Center
5) "Conserving Our Soil Today", movie, #5138, 11 min., $2.00, University of Kentucky

Activities:

1) Show movie.
2) Divide class and follow procedure in Exercise #3.
3) Show filmstrip.

Follow-up Activities:

1) "Soil Conservation", filmstrip from Bourbon County Schools Materials Center.
2) Discuss ideas: a) organic foods controversy, b) with models of soil erosion, ask class which types of conservation should be practiced.
3) "Grasses", lesson 16, Teacher's Curriculum Guide to Conservation Education, edited by Matthew J. Brennan

Evaluation:

Test as in Exercise #3.

EXERCISE #5

WILDLIFE

Title of Lesson: Smokey the Bear Speaks His Mind

Purpose:

1) To show importance of maintaining wildlife habitats
2) To show importance of conserving growth and maintenance of forests

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Think about forest conservation and wildlife habitats
2) Act out their own ideas

Materials Needed:

"Wildlife Refuge", #5939, 14 min., color, $4.50, University of Kentucky

Activities: (Role Playing)

1) Show movie: a) Scene: man in the woods chopping down trees, smoking cigarettes, throwing live matches on the ground, b) Smokey the Bear walks up.
2) Ask for volunteers.
3) Allow the students to ad-lib the whole scene.
4) When finished, ask for other ideas.
5) Repeat with other students as many times as new ideas are offered and students are interested.

Evaluation:

Repeat the next day and see how much the students retained.

EXERCISE #6

Title of Lesson: Tree Products and Recycling

Purpose:

Uses and reuses of wood

Behavioral Objectives: After completing this exercise, the students should be able to:

1) List 5 tree products and uses of each
2) List 2 ways tree products can be recycled

Activities:

1) Have each student to bring one thing made out of wood.
2) Have each student stand up and tell the class what his article is and what it is used for.
3) Write on the board as students think of other tree products.

4) Ask them what they do when they are finished with their wooden and paper products (list on the board as they recite)
5) Suggest recycling methods such as newspapers.
6) Draw life cycle of newsprint on board.
7) Have them think of other things that could be recycled.

Follow-up Activities:

Conduct a newspaper retrieval program. Students on their own time could collect old newspapers and bring to school. A school-wide contest could be held. A prize could be given to the homeroom collecting the most newspapers.

Evaluation:

1) Have students list 5 tree products and uses of each.
2) Have students list 2 methods of recycling tree products.

EXERCISE #7

For an advanced, self-motivated class, a loosely structured unit on conservation proves rewarding for student and teacher:

Title of Lesson: Conservation of Natural Resources

Purpose:

To allow each student the opportunity to probe into a special area of interest within the subject, Conservation of Natural Resources

Behavioral Objectives: After completing this exercise, the students should be able to:

1) Work successfully in a group
2) Work independently in his area
3) Use all available library sources on his topic
4) Present an oral report to the class
5) Prepare and hand in a written report

Materials Needed:

1) Library
2) Available films and filmstrips (listed under subject areas)
3) "Make Your Own World", game, Coca-Cola, available from Bourbon County Schools Materials Center

Activities:

1) Walk through Bourbon County Outdoor Lab (nature trail).
2) List the following on the board: a) air, b) water, c) soil, d) minerals, e) wildlife.
3) Each student should choose the area of his choice.

4) Each group should gather, choose a leader, and choose topics.
5) Arrange with the librarian certain days to work in the library.
6) With available sources, set up a special "sources shelf" in the library.
7) When the class gets to the library, the teacher should go around and help students; making outlines available to them if needed.
8) The teachers should encourage the students to add plants, drawings, pictures, films, and filmstrips listed in their outlines.
9) The number of days spent in the library should be dependent upon the consent of the librarian and the time the teacher feels necessary.
10) When completed, each group will present its topic in a panel fashion, answering questions afterwards and handing in completed booklets.
11) Ask students to keep a look-out for current events on conservation and when there is a spare minute, they can present them.

Follow-up Activities:

"Make Your Own World", game

Evaluation:

Evaluation of this unit would probably have to be subjective. The teacher could grade any or all of the following: a) reports, b) booklets, c) tests.

Suggested Outline for Students to Follow

I. Air
- A. Uses and importance
- B. Comparison between "city air" and "country air"
- C. Threats of air pollution
- D. What is being done and what can be done about air pollution
- E. Aids: available from Bourbon County Schools Materials Center
  1. Slides
     a. "Air Pollution"
  2. Overhead Projector
     a. "Air Replenished"
     b. "Effect of Air Pollution on Our Lives"
  3. Movie
     a. "Problems of Conservation: Air", #5105, 15 min., $3.00, University of Kentucky

II. Soils
- A. Transported and Residual Soils
- B. Main types
  1. Pedocals*
     a. chernozems
     b. chesnut
     c. desert
  2. Pedafers*
     a. grey-brown
     b. red-yellow

*Include characteristics, vegetation, color profile diagram, and the location in the United States (1a-c and 2a-b)

C. Erosion
   1. Sheet
   2. Gully
   3. Wind
   4. Animals
   5. Floods
   6. Streams
   7. Irrigation

D. Conservation
   1. Contour Plowing
   2. Terracing
   3. Strip Cropping
   4. Crop Rotation
   5. Fertilization (include organic foods controversy)
   6. Limited Grazing
   7. Stream Control

E. Aids
   1. Movies from the University of Kentucky
      a. "Erosion: Leveling the Land", #5152, 14 min., color, $4.50
      b. "Understanding Our Earth: Soil", #5092, 11 min., color, $4.00
      c. "Story of Soil", #C-5078, 11 min., $2.00
   2. Filmstrips and Slides from Bourbon County Schools Materials Center
      a. "Land Conservation Today"
      b. "Soil Conservation"

III. Water
   A. Importance
   B. Uses
      1. Life necessity
      2. Power
      3. Transportation
      4. Waste
   C. Location
      1. Surface
         a. river streams
         b. sea
      2. Underground
   D. Threats to Water
      1. Floods
      2. Pollution
   E. Conservation
      1. Flood Control
      2. Water Recycling
      3. Desalting Sea Water
      4. Restricted Area
   F. Aids
      1. Slides, Charts, Filmstrips from Bourbon County Schools Materials Center
         a. "Fish Resources", filmstrip
         b. "Pollution: the Great Lakes", filmstrip
         c. "Water Conservation", filmstrip
         d. "Water Pollution", filmstrip
      2. Movies from the University of Kentucky
         a. "Problems of Conservation: Water", #5115, 14 min., $3.00
         b. "Mississippi River" (lower river), #6042, 16 min., color, $5.50
         c. "Dams", #5885, 12 min., color, $4.00

IV. Minerals
- A. Mineral Fuels*
  1. Coal
  2. Petroleum
  3. Natural Gas
- B. Metals*
  1. Iron
  2. Zinc
  3. Copper
  4. (others)
- C. Non-Metals*
  1. Clay
  2. Sand
  3. Limestone
  4. (others)
- D. Aids
  1. Filmstrips from Bourbon County Schools Materials Center
     a. "Minerals and Metals"
     b. "Mineral Conservation Today"
  2. Movies from the University of Kentucky
     a. "Problems of Conservation: Minerals", #5103, 16 min., $3.50

V. Wildlife
- A. Interdependence of Living Things with Each Other and with Their Environments
- B. Organisms are Products of Their Environments
- C. Chain Systems
- D. Beauty and Recreation
- E. Threats
  1. Man
  2. Under-Population of Species
  3. Over-Population of Species
- F. Conservation
  1. Wildlife Refuges
  2. (others)
- G. Aids
  1. Filmstrips, Slides, Posters from Bourbon County Schools Materials Center
     a. "Habitats and Niches"
     b. "The Conservation of Wildlife"
     c. "Wildlife"
     d. "Finding Out How Animals Live"
     e. "Mutual of Omaha's Wild Kingdom"
     f. "Birds"
  2. Movies from the University of Kentucky
     a. "Wildlife Refuge", #5939, 14 min., color, $4.50
     b. "Vanishing Prairie-Buffalo, Majestic Symbol of the American Plains", #5780.1, 12 min., color, $4.50

*Include importance, uses, location and conservation for each (A1-3, B1-4, C1-4)

SPECIAL EDUCATION EXERCISE PLANS

Incorporating Environmental Studies

Sources Consulted in Developing:

Environmental Education: Objectives and Field Activities
Paducah, Kentucky

A Curriculum Guide for Nature Study in the Elementary School
McKinley Elementary School
Abington, Pennsylvania

Teacher's Curriculum Guide to Conservation Education
Edited by Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

People and Their Environment
Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Instructor
Aug.-Sept., 1969
Harcourt, Brace and World, Inc.
Instructor Park, Dansville, New York

Pollution
Mine Publishing, Inc.
25 Groveland Terrace
Minneapolis, Minnesota 55403

Outdoor Laboratory
Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Compiled by:

Mrs. Marjorie Cleaver
Special Education Instructor
Bourbon County Junior High School
Paris, Kentucky 40361

EXERCISE #1

Title of Lesson: Water In Your Home

Behavioral Objectives: At the conclusion of this exercise, each child should be able to:

1) List reasons why people, wildlife and crops need water
2) 80% will be able to list the uses of water in the home
3) Develop an awareness that water is found in all foods

Materials Needed:

1) Watermelon or tomato
2) Potted plant
3) Charts for keeping records
4) Measuring cup
5) Hot plate
6) Scales

Activities:

1) Name some of the ways water is used in your home (example: for drinking by people and animals, bathing, washing clothes, removing wastes, watering lawns, plants and trees, fishing and boating, air conditioners)?
2) Let children keep a record of the amount of water they drink in a day.
3) Discuss with the children what would happen to our wildlife and crops if all the water was polluted. (Bring in facts that germs cause diseases which kill wildlife and crops as well as people.)
4) Can we find out how much water there is in a watermelon or tomato? Weigh a piece of watermelon or tomato before and after heating it. Figure the amount of water.
5) Examine a potted plant. Ask: What do you think it needs?, How might we find out how important water is to this plant? Let someone water it. Observe changes made in looks and growth of the plant.
6) Ask: Who likes the rain?, Why do you like it?

Read 2 verses of poem, "April Rain"

It is not raining rain to me,
It's raining daffodils;
In every dimples drop I see
Wildflowers on the hills.
A health unto the happy!
It is not raining rain to me,
It's raining violets.

Robert Loverman

7) Make a chart showing the amount of water it takes to use in everyday living (example: 3 gallons to flush a toilet, 30 gallons to fill a bath tub to a depth of 6 inches, commercial air conditioners use enough water to supply the daily needs of 30,000 peoples' dishwashers).
8) Let children list what they ate for breakfast. Find out what foods contained water. Then name foods that have had the water removed (frozen juices, condensed soup). Ask: How can we restore water to dehydrated foods?

EXERCISE #1 (cont.)

Follow-up Activities:

1) Children investigate at home with other foods (apples, potatoes) to find out how much water is in living things and report their findings.
2) Write a story titled "The Community with Little Water".
3) Read the poem, "The Rime of the Ancient Mariner". The students find "Water, water everywhere, Nor any drop to drink".
4) Children can do research to find out the amount of water needed for: a) an individual (5 pts. a day), b) horse (15 gallons), c) pet dog or cat, d) birds, etc.

Evaluation:

After completion of these activities, the pupils were:
1) Able to list 8 reasons why people, wildlife and crops need water.
2) 80% of the class were able to list uses of water in the home.
3) The students demonstrated their understanding that all foods contained water.

Reference Materials:

1) Conservation Curriculum Guide. gr. 4-6, "Life Depends on Water", p. 24
2) Water: Our Most Precious Resource, p. 53
3) "Ranger Rick's Nature Magazine"
4) "Needed Clean Water", pamphlet, Resource Bureau, 300 E. 44th St., New York, New York, 10017
5) What is Water?, Pagaman, Adaline P., Benefic Press, Chicago, 1960
6) Water All Around, Pine, Tillie S., McGraw-Hill, New York, 1966
7) "Rainshower", film, Churchill Films, 6671 Sunset Blvd., Los Angeles, California, 90025

Above materials (1-7) are found in the Bourbon County Schools Materials Center.

EXERCISE #2

Title of Lesson: Water in Industries and Agriculture

Behavioral Objectives: After this exercise, the students will be able to:

1) Estimate the amount of water per day needed for work in a factory
2) Recognize that industry is the largest user of water
3) Discuss the amount of water needed for irrigation in your county
4) Discuss agricultural pollution of water resources

Materials Needed:

1) Maps of county and state
2) Apple
3) Knife
4) Charts
5) References

Activities:

1) Go on a trip to an industrial plant in your community and find out how much water is used for one industry.

2) Locate and list all the possible sources of water for your community (example: lakes, rivers, wells, ponds, streams, reservoirs, etc.).
3) Dramatize how the great volume of water in the biosphere compares with the small amount suitable for drinking; show the class an apple and ask them to imagine it as the earth. Cut the apple into quarters. Show one quarter and announce that it represents the land area of the planet. Set it aside. Ask: How much of the earth contains water area (3/4)?, How much of the 3/4 shall we call oceans (about 1/2 of the apple would represent oceans)? Set this aside, too. Ask: How much water is left now that might be suitable for drinking?, What bodies of water are included in this 1/4 left?, Could we get drinking water from the ditches (no, so set aside another thin slice as unsuitable)?, Could we get drinking water from the marsh?, From the Salt Lakes? Continue questioning and setting aside slices of the apple until only a sliver is left. Hold it up. There is really just about this much drinking water in the world (eat the sliver of apple). What would happen to all of us if it disappeared this fast (humans can live without water for about 3 days)?
4) Draw a map of Kentucky showing the use of industrial water by regions. Let children draw a circle to indicate where water is used in industry.
5) Make a graph showing billions of water used per day in industry, irrigation, domestic and livestock.
6) Make a list of all the things connected with agriculture that might pollute the water. Let each child take one topic from the list and write an essay on how it pollutes the water.

Follow-up Activities:

1) Let children participate in the seeding and mulching of the school yard to protect soil from washing and to make an attractive lawn.
2) Form an Ecology Club in your school and let children watch for gullied slopes in parks and recreation grounds. Later, do some planting and seeding.
3) Make a study of the water problems to find out if there is a threat to the future economy of the community.

Evaluation:

Each student:
1) Estimated the amount of water necessary for a factory.
2) Was able to see through this exercise that industry is the largest user of water.
3) Participated in the study of the amount of water used for irrigation in their county.
4) Should be able to participate in the discussion of agricultural pollution of natural resources.

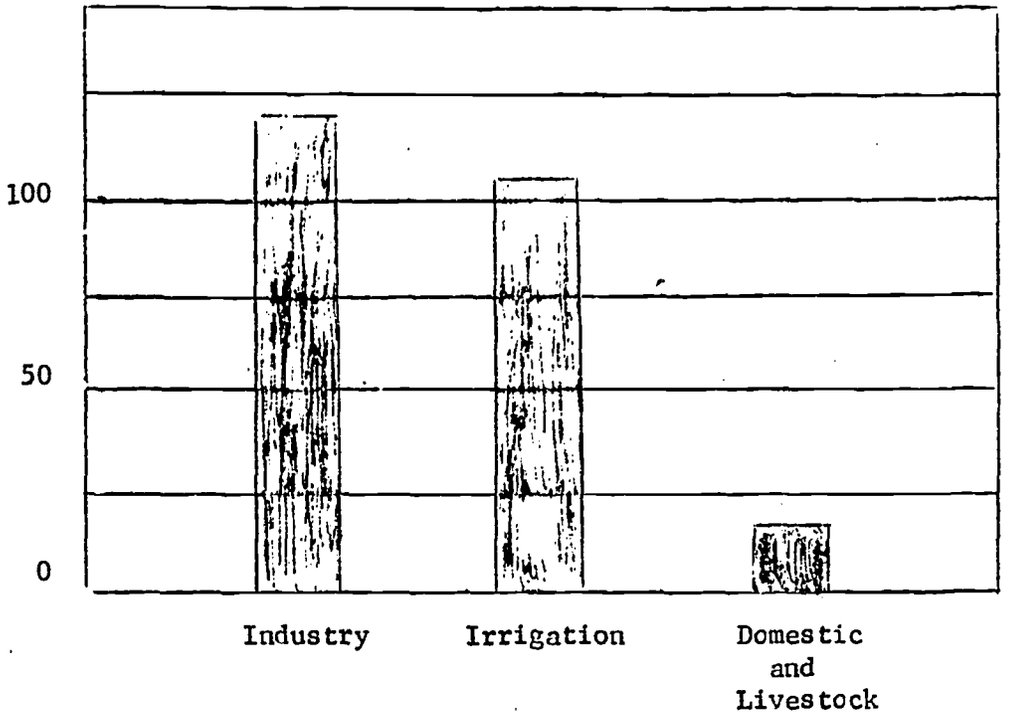
Reference Materials:

1) "Water for the High Plains", film, 14 min., color, free, Office of Chief Engineer, Bureau of Reclamation, Building 67, Denver Federal Center, Denver, Colorado, 80255

2) Water and Industry, Department of Interior, Washington, D. C.
3) National Wildlife Federation, E. Q. Index, p. 4
4) Catalyst, Vol. II, No. I
5) Farmlands and Water Quality Soil Conservation, Agriculture Pollution of Water Resources
6) Showdown, Federal Water Pollution Control Administration, U. S. Department of Interior
7) Running Water, Mine Publications, Inc., 25 Groveland Terrace, Minneapolis, Minnesota, 55403
8) Air and Water Pollution, Washington Square Press
9) What You Can Do About Water Pollution, free, Federal Water Quality Administration Office, Ohio Basin Office, 4676 Columbia Parkway, Cincinnati, Ohio, 45226
10) Posters from above address (9): "Stop Water Pollution: It's Later Than You Think", 11"x14" poster board (3 colors)
11) Look Around You, Scholastic Earth Corps, Environmental Awareness, Book I
12) Clean Water, Isaak Walton League of America, 1326 Waukegan Road, Glenview, Illinois, 60025
13) Water, National Wildlife Federation, 1412 16th St., N. W., Washington, D. C., 20036 (10¢/copy)

Above materials (1-13) can be obtained from the Bourbon County Schools Materials Center.

EXERCISE #2



Title of Lesson: The Hydrologic Cycle

Behavioral Objectives: After completion of this exercise, the students should be able to:

1) Develop an understanding of the hydrological cycle
2) Compare the extent to which both the processes of nature and the activities of man depend on water
3) Recognize that the earth's limited water supply is constantly circulating

Materials Needed:

1) Paper towel
2) Water
3) Plastic bag
4) Plant
5) Sand
6) Aquarium
7) Glass baking dish
8) Ice cubes
9) Cookie tray
10) Tea pot
11) Hot plate
12) Catch tray
13) Water sprinkler
14) Foil
15) Finger paint
16) Cardboard box
17) Water collection tray
18) Leafy branch

Activities:

1) Develop an understanding of the prefix, hydro, by writing the word hydrant on the board. Inquire about its meaning. Add the word hydroplane and ask for a definition. Establish that hydro refers to water. Then ask questions: a) What do you think hydroelectric power is?, b) What do you do when you hydrate something?, c) What if you de-hydrate it?, d) Can you imagine what hydrology might be?, e) What is a cycle?, f) What would a hydrologic cycle be (example: wet a paper towel and hold it up--If I hung this on a line on a nice, sunny day, what would happen to the water, where would it go?)?, g) Write the word, evaporation (underline vapor). What is vapor?, Is vapor a liquid, a solid, a gas?, Where would the vapor from the wet towel and from the surfaces of lakes and oceans and from streets and buildings go after a rainstorm?, h) Tie a clear, plastic bag around a small, leafy branch. What happens inside?
2) Discuss the formation of a cloud. (Stress that when water is converted from a liquid to a gas, it is purified.)
3) Write the word condensation on the board. Ask: What happens to the water vapor high in the atmosphere? When water vapor condenses, it becomes a liquid again and falls as rain. Could it fall as a solid?, What about ice, snow and hail?

EXERCISE #3 (cont.)

4) Write the word precipitation on the board and explain that this word best describes all the forms that water takes when it falls to earth.
5) Have children repeat the 3 words which describes the hydrologic cycle using circular arm motions. Draw a circle on the board to show the cycle.
6) Let children discuss what happens to water when it hits the ground, run off water, water that percolates through the soil, water that fills reservoirs, water that drops into lakes, oceans, etc. Ask: Can we say that because of the hydrologic cycle we never really lose our water?, Does nature help to purify our water?
7) A simple demonstration of our world's closed water system can be created in the classroom illustrating both evaporation and condensation.
8) Demonstrate how water flows, due to land elevations, from high mountains, through streams, into swamps, lakes, rivers and finally to the sea. Possibilities of land erosion and water pollution can also be noted. Water sprinkled on the foil will flow down "gullies", collect in "lakes", overflow these into large streams or "rivers", on the way to collection tray (ocean). Paint will wash off where water flows leaving a chart of a "watershed".

Follow-up Activities:

1) Ask the children to imagine that each of them is one single raindrop. Have them write a creative story, telling their adventures in each area of the hydrologic cycle. These could be put into the form of a booklet for display during an open house.
2) Establish a water table using sand, water and an aquarium or glass baking dish. Find out how underground water fits into the cycle. What activities lower the water level in many places?, Why should people be concerned about water table?
3) Construct a mural showing the hydrologic cycle.
4) On the board write, "The water you bathe in tonight may contain some of the same water that Moses was hidden in as an infant or that Daniel Boone crossed on his trip west." Instruct children to read the comment carefully and then write one or two paragraphs explaining its meaning and why they think it is true or false (hydrologic cycle).

Evaluation:

After completion of this exercise:
1) 75% of the class were able to demonstrate by drawing the hydrologic cycle.
2) The students were able to recognize that the processes of nature and the activities of man depend on water.
3) The students were able to recognize that the earth's limited water supply is constantly circulating.

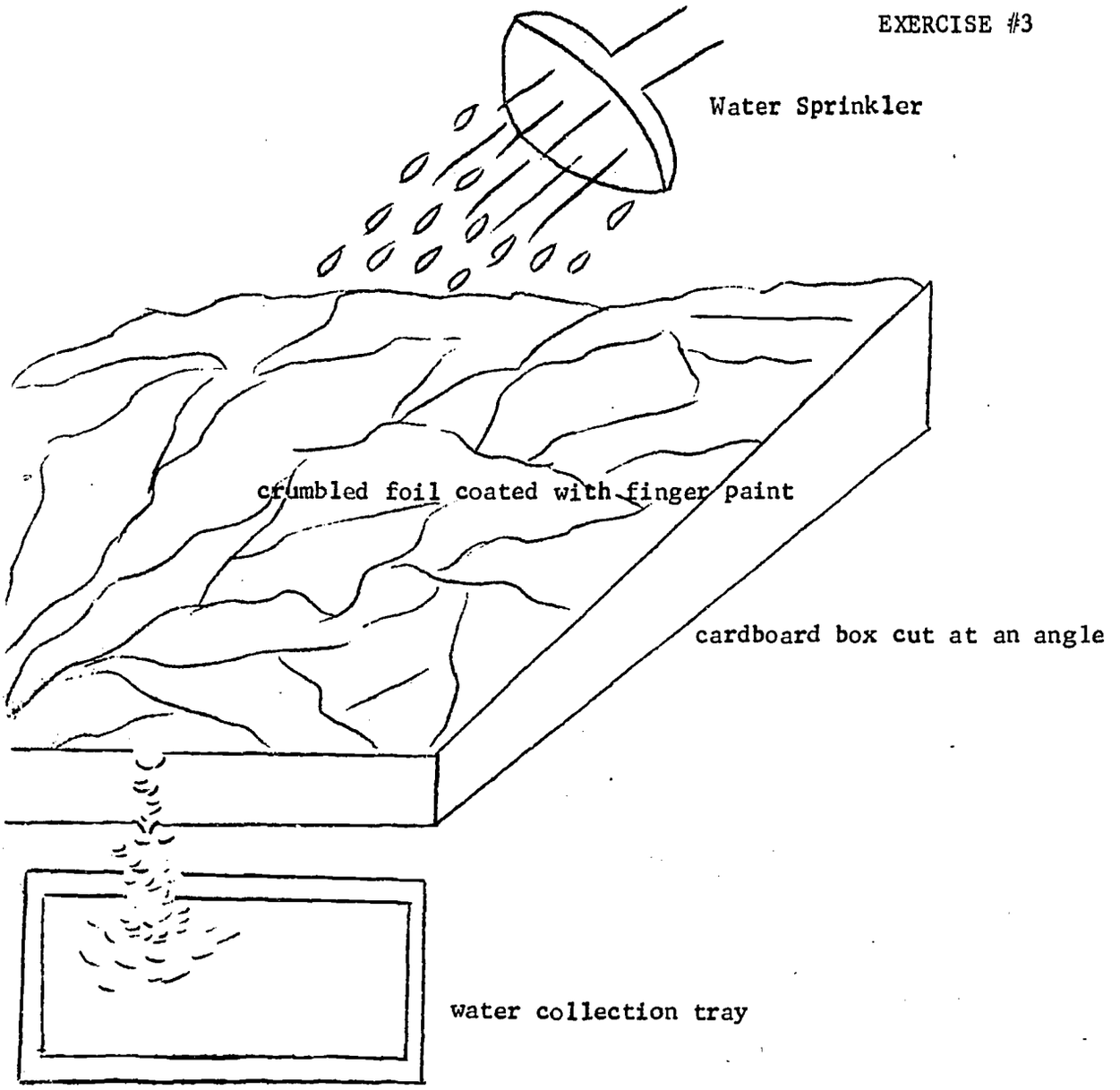
Reference Materials:

1) Water, Riches or Ruin, Bauer, Helen Doubleday
2) Realms of Water, Cycle in Nature, Kuenen, Philip H.

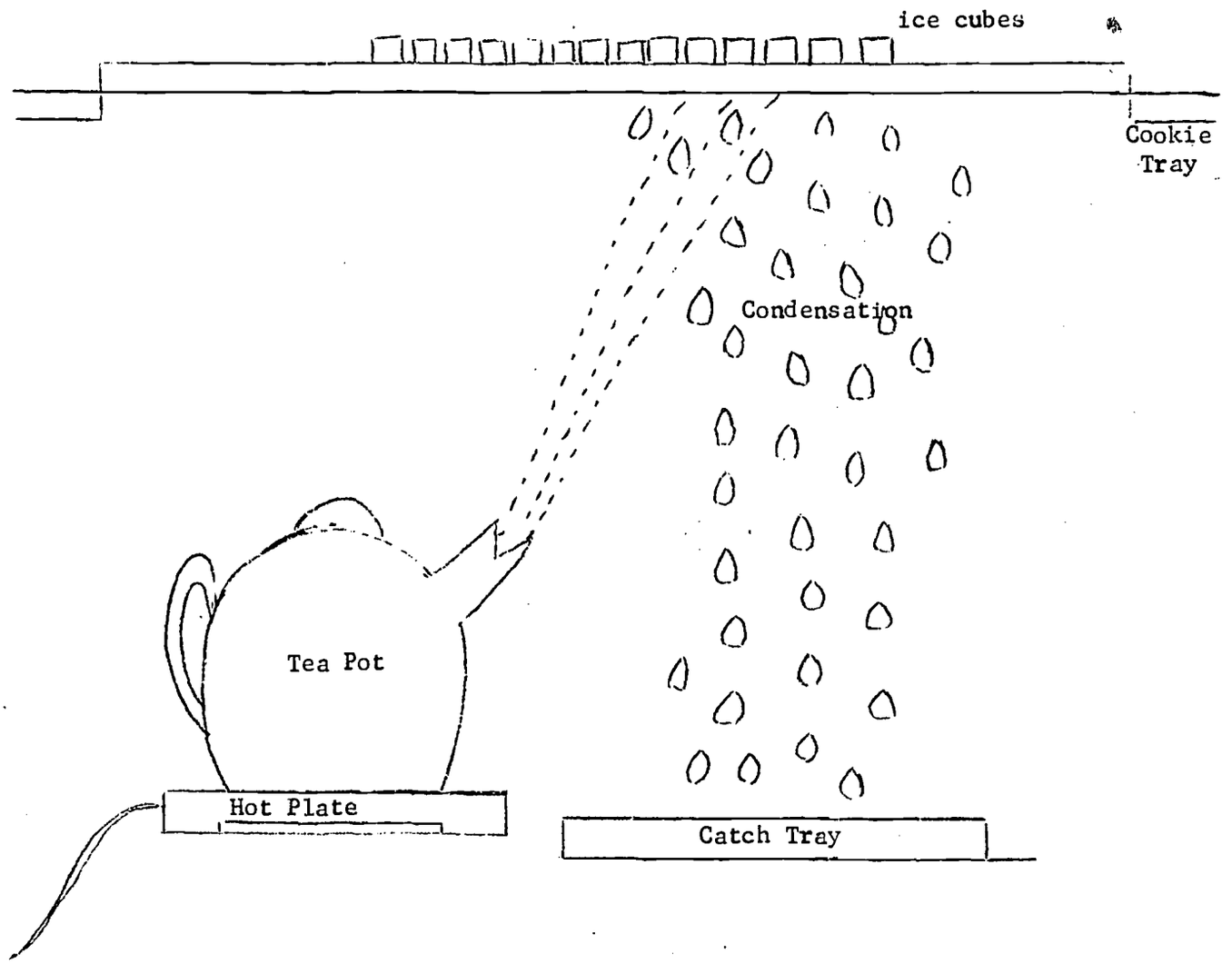
3) A Primer on Ground Water, Baldwin, Helen L. and McGuenness, C. L., 1963
4) U. S. Geological Survey, Washington, D. C., 20242
5) Our Natural Resources, Study Guide, The Garden Club of America
6) Glaciers: A Water Resource, 23pp. illus., Free Information Office, U. S. Geological Survey, Washington, D. C. 20242
7) Why is the Ocean Salty?, Free Information Office
8) Water of the World, Free Information Office
9) Hydrologic Cycle, Free Information Office
10) What is Water?, Free Information Office
11) Water and Industry, Free Information Office
12) Natural Steam for Power, Free Information Office
13) Federal Pollution Control Programs: Water, Air and Solid Wastes, Bureau of National Affairs, Washington, D. C., 20037
14) "Natural Water Cycle", pamphlet, U. S. Department of Agriculture, Forest Service, South Building 12th St. and Indiana Ave., S. W., Washington, D. C., 20250
15) "Water and What It Does", film, Encyclopedia Britannica, 1150 Wilmette Ave., Wilmette, Illinois, 60091

Some of the above materials can be obtained from the Bourbon County Schools Materials Center.

EXERCISE #3


Water Sprinkler
crumbled foil coated with finger paint
cardboard box cut at an angle
water collection tray

EXERCISE #3



The temperature can be varied to show the effect of atmosphere changes on precipitation.

Title of Lesson: Water Pollution

Behavioral Objectives: At the conclusion of this exercise, each student will show that he has some understanding of the problems of water pollution by:

1) Recognizing ways of preventing water pollution
2) At least 75% of the class will be able to tell when water is unsafe to use
3) Discover that clean water is important to living things
4) Recognizing that less than 1% of the earth's water is usable and that 99% is salty oceans, glaciers and polar ice caps

Materials Needed:

1) Water glass of clear water
2) Water glass of dirty water
3) Pictures of polluted streams
4) Books
5) Detergents
6) Trash that pollutes the water
7) Magazines
8) Oaktag

Activities:

1) Introduce the word pollution. Ask children to smell the 2 containers of water. Could fish and plants live in polluted water?
2) Show pictures of polluted streams and pictures of clear, sparkling streams of water.
3) Take the children on a field trip to a polluted stream in your area.
4) Observe heavy rainfall as it carries the water and waste into the streams.
5) Visit a clean, farm pond.
6) Make a scrapbook of pictures showing how people, animals and plants use clean water.
7) Play a game of "Ad--Verse". The first player starts to tell a story of water pollution in a rhymed jingle: "I saw a stream as sweet as cream." The second player: "It was clear and blue and sparkling, too." The third player might add: "The stream soured and algae flowered." Continue the jingle until the story ends. The jingle could be written on the board and copied to be used again.
8) Show some detergents. Lead children to the awareness of the amount of detergents that go "down the drain". Ask what happened to the sudsy waste water at the sewage plant. Then ask what would happen to fish or plants in such water.
9) Use large pieces of oaktag to make collages of the causes of water pollution (work in groups). Children can bring in items and arrange them in interesting ways before gluing them on the oaktag. Items could include: labels of detergent bottles, granules of detergent (stuck on with water), piece of a fertilizer bag, sprigs of dried algae, fish bones, bottle caps, etc. The collages would be displayed on a hall or room bulletin board. The caption might read, "Where Has All the Beauty Gone?". At the lower right hand side of the bulletin board designate a specific polluted body of water in your area: lake, pond or river.

Follow-up Activities:

1) Make a graph showing how much of the earth's water supply is usable.
2) Ask for antonyms to describe polluted water (example: sparkling, crystal, clear, pure).
3) List adjectives on the chalkboard: smelly, slimy, muddy, dirty, green, rusty, brownish.
4) Hold a panel discussion about the effects of water pollution.
5) Write a letter to the P.T.A. asking them to plan a water pollution discussion at one meeting.
6) Produce a program for radio or television about your community's water pollution problems. Present it live or pre-recorded before other classes.
7) Students could write an essay on what would happen if garbage was thrown in our streams.

Evaluation:

Each student demonstrated his knowledge of water pollution by:
1) Listing 8 ways of preventing water pollution.
2) 75% of the class were aware of the fact that pollution exists and that its cause and cures affect each person.
3) List ways that clean water is important to living things.
4) The students recognized that less than 1% of the earth's water is usable and that 99% is salty oceans, glaciers and polar ice caps.

Reference Materials:

1) Instructor, Aug.-Sept., 1969
2) The Wastemaker, Pachard, Vance and McKay, Davis
3) Our Polluted World: Can Man Survive?, Perry, John, Franklin Watts Co.
4) Sparkling Water, Shuttlesworth, Dorothy E., Doubleday and Co.
5) The Grade Teacher, Oct., 1970
6) Fresh and Salt Water, Cadbury, B. Bartram, Monkato Creative Education Society
7) Pollution: Examining Your Environment, Mine Publications, Inc., 25 Groveland Terrace, Minneapolis, Minnesota, 55403
8) River of Life, 96 pp., $2.00, dozens of full color photos, Superintendent of Documents, G.P.O. (Government Printing Office)
9) Pollution: The Waters of the Earth, Jones, Claire; Gadler, Steve; Engstrom, Paul H., Lerner Publications, 1971
10) Our Troubled Waters, Sorvall, Vivian, Pendulum Books, 1971

Some of the above materials can be found in the Bourbon County Schools Materials Center.

EXERCISE #5

Title of Lesson: Water Treatment: Before Using, After Using

Behavioral Objectives: At the conclusion of this exercise, the students should be able to:

1) Distinguish the difference between pure and impure water
2) Recognize the various sources of our water supply
3) Explain reused water and the hydroelectric power plant

EXERCISE #5 (cont.)

Materials Needed:

1) Sample of pure drinking water
2) Plastic pill container
3) Sifter
4) Cotton
5) Gravel
6) Muddy water
7) Sand

Activities:

1) Read "April Rain Song":
   Let the rain kiss you
   Let the rain beat upon your head
   With silver liquid drops,
   Let the rain sing you a lullaby.

   The rain makes still pools on the sidewalk,
   The rain makes running pools in the gutter,
   The rain plays a little sleep song on our roof at night,
   And I love the rain.

   Langston Hughes
2) Place labeled samples of pure drinking water in plastic pill container on the display table. Inquire if anyone noticed any particular insects in the clean water of the reservoir. (The larvae of the black may fly is found in clean water.)
3) Obtain a dime store sifter. Cover the screen with a layer of absorbent cotton, next a one-inch layer of fine sand, a one-inch layer of course sand, and then a one-inch layer of gravel. Set the sifter over a jar and slowly pour muddy water into it. Ask: Does the water look clean when it comes out of the bottom (the water may look clean, but still contains germs)? Compare this with sewage and waste treated in regular treatment plants.
4) Take a trip to the town's water treatment plant. Find out what is done to make the water pure.
5) Have children summarize the facts learned in the interview at the water plant (example: reused water, filtration, number of gallons used per person per day and source of water supply).

Follow-up Activities:

1) Make drawings showing the filtration at the plant.
2) Have each child to construct a booklet consisting of about 20 lined pages and an oaktag cover. Ask each child to imagine that he is a body of water (a pond, stream, lake, brook, river) and to keep a daily account (a diary) of things that happen to him. As the unit progresses, the diaries reflect the learning that is taking place. Have each child give his diary a name such as: "Little Happenings In Big River", "My Name is Crystal Lake", or "Sparkling Water".
3) Play the game, "Dirty Water: The Water Pollution Game". Each player assumes the role of a water pollution control official who is responsible for stocking his lake. Throughout the game, he must learn to anticipate possible pollution, attempt to avoid the problem of over-population, manage his finances efficiently and consider the

problem as possible pollution coming from upstream. A player wins the game by controlling water pollution successfully and, thereby, being the first to completely stock his lake.

Evaluation:

At the conclusion of this exercise, students were able to:
1) Distinguish the difference between pure and impure water.
2) List the various sources of our water supply.
3) Explain how water could be reused and the hydroelectric power plant.

Reference Materials:

1) A Primer of Waste Water Treatment, 55¢, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402
2) International Wildlife, July-Aug., 1972, p. 24
3) National Wildlife Federation, 1971 E. Q. Index
4) "Kentucky Happy Hunting Ground", May, 1972
5) Conserving Our Waters and Clearing the Air. American Petroleum Institute, Study Manual
6) Instructor, April, 1972, p. 104
7) Spoiled Tomatoes, Bowmar
8) "Dirty Water: The Water Pollution Game", Urban Systems, Inc., 1033 Massachusetts Ave., Cambridge, Massachusetts, 02138
9) "Freshwater Pollution", filmstrip, Ward's
10) "The Muddy Raindrops", filmstrip, Society for Visual Education
11) "Pollution: The Great Lakes", filmstrips, Part I, II, III, Time-Life Building, New York, New York, 10020
12) "Water Pollution", filmstrip, J. Weston Walch

The above materials can be obtained from the Bourbon County Schools Materials Center (1-12).

EXERCISE #6

Title of Lesson: What Can You Do to Help Save Our Water Supply?

Behavioral Objectives: At the conclusion of these activities, the student should be able to:

1) List 5 ways they can conserve water
2) Show an understanding of human needs and desires and realize that they are greater than the resources available to meet the expressed needs
3) Participate in water conservation in their county

Materials Needed:

1) Maps of Kentucky and the United States
2) Canteen filled with water
3) Film on water
4) Charts

Activities:

1) Make a list of the ways you can use water more carefully: a) How

much water is used to wash the family car? Get a watch with a second hand. Time how long it takes to fill one gallon bucket with water from a hose. Then time how long it takes to wash the car from a hose. How many gallons used (children can see that it will conserve water to use water in a pail)., b) A leaky faucet losing one drop of water each second wastes 4 gallons of water a day, so close faucets tightly., c) Don't let the water continue running while brushing your teeth or washing dishes., d) Don't run water just to get a cool drink (keep a container of water handy in the refrigerator)., e) Sprinkle lawns and flowers in early morning or evening (less water is lost at these times).

2) Children can figure how much water you use a month, a year. Ask: How would you like to carry that much from a well?
3) Let the children record how many times they turn on a faucet in one day. Record the total for the class. Try to figure out how you can cut down on the number of times in order to conserve water.
4) Teacher brings in a conteen filled with water and explains that this canteen is an allotment of water for all purposes for one day. "I'm going to try to keep within the allotment. Will you try this with me?"
5) Use a map of Kentucky showing location of population. Use another map showing water resources. Color with blue all the areas of water.
6) Have children list all the destructive forces of water.
7) Show film on water.
8) Children could write an autobiographical questionnaire to examine the students behavior in regard to water pollution. Use questions such as: Have you ever thrown refuse on the ground?, Have you fixed a leaky water fixture for your home?, Have you ever asked your mother to change her laundry detergent?
9) Let children list things they can do to improve water pollution in the home, and on outings.

Follow-up Activities:

1) Children can do research work to find out the civilizations that were destroyed by depleting their soil and water resources. Then have them try to find things that would have prevented this.
2) Make a list of ways to solve problems in water conservation now and in the future (example: a) improve water treatment, b) use of additional ground water, c) provide ground storage, d) suppression of evaporation to increase net run off, e) desaltination of water.
3) Students pretend that as adults of the 21st century, they have solved all major water problems. Let them write about what they did as citizens and tax payers to restore health and beauty to their environment.
4) Children can sing the folk song by Barbara Emberley, "One Wide River to Cross" (see Favorite Folk Tales).
5) Read the poem:

The voice that beautifies the soil!
The voice on high,
The voice of the rolling thunder,
Above the darkening clouds
Again and again it is heard,
The voice that beautifies the soil!

(Navajo Chant)

EXERCISE #6 (cont.)

Evaluation:

After the completion of these activities, the students could list:
1) 5 ways to conserve water.
2) Students were able to show an understanding of human needs and desires and became more aware that the needs are greater then the resources available.
3) Participated in water conservation in their county.

Reference Materials:

1) "Ten Little Rain Devils", pamphlet, S. C. S. (Soil Conservation Ser.)
2) "Water and the Land", U. S. Health, Education and Welfare, pamphlet
3) "Everything Needs Water", pamphlet
4) "Will We Have Enough Water?", pamphlet, Humble Oil Refining Co.
5) "A Fresh Water Sale", pamphlet, adv. from American Petroleum Institute, 1271 Ave. of the Americas, New York, New York
6) Silent Spring, Carson, Rache.
7) Natural History, Apr., 1972, p. 48
8) Instructor, Mar., 1972, p. 116
9) Water Pollution, Berg, George G., p. 28, Recycling Waste Water
10) The Sea Around Us, Carson, Rachel
11) Junior Science Book of Water, Peterson, Ottis, Scarsdale, Garrard, 1966
12) "Clean Water: It's Up to You", free, monthly, pamphlet
13) "What You Can Do About Water Pollution", U. S. Government Printing Office, Washington, D. C., 20402, pamphlet
14) "Conservation Water Recreation", transparencies, Creative Visuals
15) "Water Conservation", filmstrip, J. Weston Walch

The above materials can be obtained from the Bourbon County Schools Materials Center (1-15).

EXERCISE #7

Title of Lesson: Animals and Their Young

Behavioral Objectives: After completion of this exercise, the students should be able to:

1) Describe how a mother animal cares for and protects its young
2) Contrast and compre this care and protection to their own family needs
3) Tell more about animals in their community
4) Practice conservation of wildlife
5) Encourage proper care of pets

Materials Needed:

1) Pictures of animals
2) Paper
3) Paints or chalk
4) Live animals
6) Cage
7) Jar for animals from the pond

EXERCISE #7 (cont.)

Activities:

1) Study animals we should know
   a) Kinds: wild
      1) squirrel
      2) deer
      3) gophers, etc.
      Tame
      1) dog
      2) cat
      3) cow
      4) horse, etc.
   b) Homes
      1) ground
      2) trees
      3) brush piles
      4) rocks, crevices
      5) man-made
   c) Young
      1) protection and care
      2) drink milk from mother
      3) eyes closed at birth
      4) hair all over body
   d) Food
      1) meat eaters
      2) plant eaters
2) Visit a museum.
3) Make a booklet of animal families.
4) Discuss the care of pets.
5) Let children tell stories about their pets.
6) Write safety rules about animals.
7) Invite a Game Warden or a Conservationist to speak to the children on animals and their young.
8) Learn some songs about animals.
9) Write a poem about your pet.

Follow-up Activities:

1) Review what we have learned about animals and their young.
2) Make chart listing names of animals and their young (example: bear: cub, cat: kitten, goat:kid).
3) Display booklets of animal families and their young.
4) Place a bowl of tadpoles, minnows, a turtle or frog in the science corner. Print the questions: Would this animal live in a desert terrarium?, Would it live in a cage?. Put a live rabbit in a cage. Print the question: Would this animal live in an aquarium?, Would it live in a cage?
5) Children can cut out pictures of animals and their young. They can be made into a frieze, add trees, grass, plants, shrubs and water with tempera paint or colored chalk. Place the cut out animals in their proper setting.

Evaluation:

1) Children will be able to understand the relationship between mother animals caring for their young and their own family care.
2) Children will have a better understanding of reproduction.

3) Children will understand how animals found in one location differ from those found in another.

Reference Materials:

1) Teacher's Curriculum Guide to Conservation Education, edited by Matthew J. Brennan, Director, Pinchot Institute (can be obtained from the Bourbon County Schools Materials Center)
2) Let's Find Out About Animal Homes, by Schapp, Charles and Martha
3) Elementary School Science and How to Teach It, Blough, Glen
4) "Pets to Make an Aquarium", filmstrip, Jam Handy, 2821 Grand Blvd., Detroit, Michigan
5) "Learning About Animals", filmstrip, Encyclopedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Illinois
6) "Animal Homes", filmstrip, McGraw-Hill Films, 330 W. 42nd St., New York, New York
7) Visit to the Children's Zoo, El Lilly Co., Public Relations Services, Dept., 307 East McCarty St., Indianapolis, Indiana (free)
8) How to Care for Your Dog, Ralston Purina Co., Purina Pet Care Center, Dr. J. E. Durbin, Director, 835 So. 8th St., St. Louis, Missouri (free)
9) Kittens and Cats, Puppies and Dogs, Small Animals, American Humane Association, Education Department, P. O. Box 1266, Denver, Colorado (free)

School Library Reference Materials:

1) Kittens and Cats, Animal Welfare Institute, P. O. Box 3492, Grand Central Station, New York, New York
2) Animal Babies, Harper, '59
3) Animals as Parents, Morrow, '65, 96p. illus., Selsam, Millicent E.
4) Wonders of Animal Nurseries, Dodd, '68, 63p. illus. by the author, Berrill, Jacquelyn
5) Zoo Babies, Morrow, '59, 94p. illus.
6) Junior Science Book of Pond Life, Garrard, '64, 64p. illus., Crosby, Alexander L.
7) Odd Pets, Crowell, '51, 166p. illus, Hogner, Dorothy Childs
8) All About Animals and Their Young, Random, '58, 148p. illus., McClung, Robert M.
9) When Animals are Babies, Holiday, '64, Schwartz, Elizabeth and Charles
10) Pondlife, Golden Nature Guide, Golden, '67, 160p. illus., Reid, George K.
11) Life in a Pond, Golden, '67, illus., Robinson, Carmelita K.
12) All Kinds of Babies, Four Winds, '69, illus., Selsam, Millicent E.

EXERCISE #8

Title of Lesson: Wildflower Study

Purpose:

To encourage the child to become more aware of the native wildflowers near their homes

Behavioral Objectives: After this exercise, the children should be able to:

1) Identify 5 wildflowers in their surroundings

2) Have a knowledge of the section of the country where they grow
3) Identify leaf shapes and flower shapes
4) Recall blooming season for these flowers
5) Be more aware of the conservation of wildflowers

Materials Needed:

1) Filmstrip, "Wildflowers Everyone Should Know"
2) Pictures of wildflowers
3) Books on wildflowers
4) Ferns
5) Terrarium
6) Construction paper for scrapbook
7) Shingles
8) Glue

Activities:

1) Plan a wildflower tour to the woods and along streams.
2) Have children notice the colors of the flowers, insects that are around the flowers and how the flowers smell.
3) Prepare a terrarium using moss, wildflowers, ferns and lichens.
4) Make a wildflower clock showing time of day and night different wildflowers bloom.
5) Create a bulletin board using some wildflower cutouts, pressed ferns and moss.
6) Make a scrapbook with dried wildflowers.
7) Write a short paragraph about a wildflower of your choice.
8) Play the games, "Be a Wildflower Explorer", and "Flower Wedding", Audubon Plant Study Program (can be obtained from the Bourbon County Schools Materials Center).
9) Dry some wildflowers, ferns, moss and grass. Arrange in a pleasing design on a rough shingle then glue in place.

Evaluation:

Have children:
1) Identify at least 5 wildflowers from pictures or real flowers.
2) Describe the location where some wildflowers grow.
3) Tell the blooming season for at least 3 flowers.
4) Practice conservation of wildflowers.

Reference Materials:

1) A Curriculum Guide for Nature Study in the Elementary School, developed by Mrs. Marilyn Greulach, McKinley Elementary School, Abington School District, Abington, Pennsylvania
2) Southeastern Pennsylvania Outdoor Education Center, Media, Pennsylvania
3) Wildflowers in Kentucky, Dr. Whacton and Barbour
4) Audubon Plant Study Program, National Audubon Society
5) Beginners Guide to Wildflowers, Ethel Hinchley Hauson
6) Wildflowers of Spring, G. Friesner and M. Hill

EXERCISE #8 (cont.)

School Library Reference Materials:

1) First Book of Wildflowers, Watts, '61, 268p. illus., Cavanna, Betty
2) Macmillan Wildflower Book, Macmillan, '54, 480p. illus., Hylander, Clarence J.
3) Flowers: Guide to Familiar Wildflowers, Golden, '50, 157p. illus., Simitt, S. and Martin, Alexander C.

EXERCISE #9

Title of Lesson: Plants that Poison

Behavioral Objectives: At the conclusion of these activities, the students should be able to demonstrate their skills in:

1) Recognizing 3 kinds of harmful plants
2) Identify the toxic part of at least 3 plants
3) Describe orally the danger of poisons contained in them
4) Name 3 symptoms involved if one falls prey to these dangerous plants

Materials Needed:

1) Pictures of poisonous plants
2) Notebook and pencil for notes
3) Collection of poisonous plants for display in the classroom
4) Stories about children who have had a serious illness from poisonous plants
5) Chart of plants that poison

Activities:

1) Question that may be asked: a) Has anyone in your family ever been poisoned by plants (let children describe results)?, b) What are poisonous plants?, c) What makes some plants poisonous and some non-poisonous (inherited characteristics, protection, result of waste products)?, d) How do these poisonous plants affect people?, e) Why are some people allergic to poisonous plants?, f) Discuss types of plants that are poisonous when chewed.
2) Give reasons why you would not go into the woods and gather mushrooms to eat.
3) Which parts of a plant might be poisonous (leaves, thorns, stem, seed, flowers, fruit)?
4) Are animals poisoned from plants?
5) Are animals able to distinguish the difference between poisonous plants and non-poisonous plants?

Follow-up Activities:

1) Go on a trip around your school yard and find as many poisonous plants as you can.
2) Make a large chart listing plants that are poisonous and include the toxic part of the plant and the symptoms.
3) Put plants into different categories: house plants, flower and garden plants, vegetable garden plants, ornamental plants, trees and shrubs, plants in swamp or moist areas, plants in wooded areas, plants in fields.

EXERCISE #9 (cont.)

Example: House Plants

Plant	Toxic Part	Symptoms
Daffodil	Bulbs	Nausea, vomiting, diarrhea, may be fatal

4) What characteristics do these plants have that make them easy to recognize? Identify poison oak and ivy leaves (remember: if leaves are three, let them be).
5) Should we eat berries and fruit we find in fields and woods?
6) Find ways to tell if plants are poisonous: a) send plants to the state herbarium for determining the amount of poison, b) dry or fresh plants can be mailed in a plastic bag.
7) A good project: go out and burn or spray poisonous plants around the school ground (keep proper distance from the plants so as not to inhale the fumes from the spray or burned plants and stand opposite the way the wind blows).
8) Write a short story about a child lost in the woods who came in contact with poisonous plants.

Evaluation:

1) The child can recognize plants and berries that are beautiful to look at but are poisonous.
2) The child can recall the toxic parts of some plants and the result of being in contact with them.
3) The child will describe some of the symptoms relating to poisonous plants.

Reference Materials:

1) People and Their Environment. Teacher's Guide to Conservation Education, edited by Matthew J. Brennan, Director, Pinchot Institute
2) Poisonous Plants of the United States and Canada, by John M. Kingsbury
3) "Common Poisonous Plants", leaflet, U. S. Department of Agriculture, Soil Conservation Service, Washington, D. C.
4) Free materials from the National Safety Council, School and College Department, 425 N. Michigan Ave., Chicago, Illinois
5) "Plants that Poison", poster, Geigy Agricultural Chemicals, Division of CIBA, Saw Mill Road, Ardsley, New York

EXERCISE #10

Title of Lesson: Weather Folklore

Behavioral Objectives: After completion of this exercise, children should be able to:

1) Develop an appreciation for and become familiar with folklore
2) List 3-5 ways the pioneers predicted the weather
3) Make predictions about the weather by using folklore when weather situations arise

Materials Needed:

1) Books on folklore: Weather Folklore, Sandersons
2) Construction paper
3) Cotton
4) Paints
5) Crayons

Activities:

1) Let children ask parents and grandparents to recall old weather folklore sayings they have heard.
2) Try to find out how many are accurate.
3) Read as many books on folklore as you can find available.
4) Keep records of conditions that suggests weather folklore.
5) Obtain an almanac to create interest in folklore.
6) Compare weather forecasts today with that of long ago.
7) Draw pictures to illustrate the folklore stories and make a bulletin board display.
8) Read to find more about the natural explanations for weather folklore as told in each story.
9) Compile a list of old weather folklore sayings such as the following:

a) A heavy harvest of nuts predicts a bad winter.
b) When sheep are in a huddle, there will be mud in the puddle.
c) When the Indians could hang a powder horn on the moon, it was a sign of rain before noon.
d) A heavy coat of fur on animals denotes a severe winter.
e) A cricket call denotes signs of fall.
f) Ants in a straight line is a sign of rain; when ants scatter, expect fair weather.
g) Rain crow's call in the evening means it will rain that night.
h) Rain before seven, clear before eleven.
i) If March comes in like a lion, it will go out like a lamb.
j) When a turtle bites, it will not let loose until it thunders.
k) Evening red and morning gray sends a traveler on his way; evening gray and morning red, puts a cover over his head.
1) Thunder in February, it will hail in May.
m) Sunshine and shower, it won't last a half hour.
n) Rooster's crow before midnight, you will have falling weather within 24 hours.
o) When one sees lightning, count the seconds until he hears the thunder; the number of seconds indicate how many miles away the lightning struck.

Evaluation:

1) The child can show appreciation by the material he has brought in.
2) The children can list ways pioneers predicted the weather.
3) Several times the children predicted the weather by a folklore.

Reference Materials:

Sandersons Weather Folklore

EXERCISE #10 (cont.)

School Library Reference Materials:

1) Storms, Their Origins and Effects: Forecasting and Weather Lore, Golden, '66, 58p. illus., Lehr, Paul E.
2) Lightning, Rand McNally, '61, 61p. illus., Bendick, Jeanne
3) Wind, Rand McNally, '64, 80p. illus., Bendick, Jeanne

EXERCISE #11

Title of Lesson: Enjoy a School Nature Garden

Behavioral Objectives: At the conclusion of this exercise, the children should be able to:

1) Keep surroundings around the home beautiful
2) Keep children more aware of the beauty of nature and natural processes
3) Develop powers of observation

Materials Needed:

1) Area suitable for a nature plot
2) Bird feeders
3) Bird bath
4) Weather station
5) Weather instruments
6) Sun dial
7) Wildflowers
8) Ferns
9) Logs
10) Stumps
11) Moss
12) Rocks
13) Rock garden
14) Miniature fish pond
15) Water lillies
16) Rustic seats (made by children)
17) Trees to plant
18) Shrubs to plant

Activities:

1) Children and teacher will select a suitable area near the school to improve its conditions and to be used as a site for the nature area.
2) Clear off debris.
3) Draw a sketch of the proposed plans for the nature area.
4) Make some bird feeders to encourage birds to become permanent residents: a) bird feeders can be made from mesh onion bags filled with suet, b) plastic gallon jugs and pie pans, c) pine cones using suet and peanut butter, d) feeders made of wood, e) hang popcorn on trees for birds.
5) Make a bird bath --- a simple one can be made from a garbage can lid and gravel. Keep filled with clean water.
6) Build a weather station.

7) Make some weather instruments: a) make a weather vane to put on a tall post, b) build a sun dial.
8) Find places where wildflowers are plentiful. Transplant some in nature area: plant some ferns and mosses near this setting.
9) Search for old logs and stumps in which animals should make their homes. Place some of these near the wooded area.
10) Take the children on a trip to a stream and find interesting rocks large and small for a rock garden. Be sure to get different kinds and shapes. The larger ones should be used around the edges of the rock garden.
11) Near the rock garden, build a small fish pond. Children can bring some goldfish from their homes or minnows they catch from a stream near their home.
12) Plant a few water lillies for color near the pond.
13) Use larger rocks and logs to build seats for children to use and enjoy the nature area.
14) Plant some trees and shrubs that bloom in wooded areas.

Follow-up Activities:

1) Class can study the temperature changes in the shaded area and sunny areas.
2) Keep a record of the time of day the temperature was the highest and lowest.
3) Why is the temperature cooler in the shady spots (trees, shrubs overhead)?
4) Count the chirps of a cricket. Count the number of [illegible] seconds and add 38. The answer will be the approximate Fahrenheit temperature.
5) Observe bird nests, their location and nesting materials.
6) Watch for animals that are visiting the area: list clues they found such as tracks, nests, dens, feathers, fur, cocoons, hair.
7) Make bird silhouettes.
8) Make nature prings from dried materials.
9) Play a game "Nature Alphabet". Children print letters of alphabet. Go to nature area and find things of nature beginning with letters of the alphabet.
10) Play games matching tracks with animals on flash cards.

Evaluation:

1) The child kept the surroundings around his home beautiful.
2) The child was aware of the beauty found in nature.
3) The child developed powers of observation.

Reference Materials:

1) People and Their Environment, Teacher's Curriculum Guide to Conservation Education, edited by Matthew J. Brennan, Director, Pinchot Institute
2) A Curriculum Guide for Nature Study in the Elementary School, developed by Mrs. Marilyn Greulach, McKinley Elementary School, Abington School District, Abington, Pennsylvania
3) Environmental Education: Objectives and Field Activities, by James M. Major and Charles A. Cissell and the Paducah Public Schools Environmental Education Staff, Paducah, Kentucky

School Library Reference Materials:

1) Let's Collect Shells and Rocks, Shell Oil Co. (free)
2) First Book of Stones, Watts, '50, 93p. illus., Cormack, M. B.
3) How and Why Wonder Book of Mushrooms, Ferns and Mosses, Grosset, '65, 48p. illus., Jensen, Amy Elizabeth
4) Field Book of Common Rocks and Minerals, Putnam, '48, 352p. illus., Loomis, Frederic B.
5) A Guide to Trees and Shrubs, Houghton, 431p. illus., Petrides, George A. and Peterson, R. T.
6) Field Guide to Rocks and Minerals, 3rd ed., Houghton, '60, 349p. illus., Pough, F.
7) Doubleday First Guide to Rocks, Doubleday, '63, 30p. illus., Shuttlesworth, Dorothy
8) Story of Rocks, Garden City, '56, 56p. illus., Shuttlesworth, Dorothy
9) Story of Mosses, Ferns and Mushrooms. Doubleday, '55, 159p. illus., Sterling, Dorothy
10) Rocks and Minerals, Golden, '57, 160p. illus., Zim, He berts